Key to stable sodium dispersions: white mineral oil 47

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. . . also more than 200 terse reports on new processing techniques, chemicals, instruments, equipment 6

AUGUST 1959

CHEMICAL PROCESSING®

OLIN MATHIESON

ON THE MOVE

President STANLEY de J. OSBORNE . . . a reason to smile as company reorganization pays off . . . 23

$1.00 the copy

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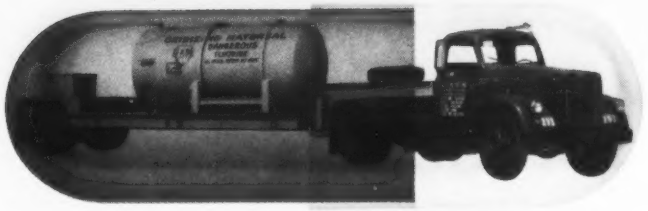


CAPSULE REPORT ON ELEMENTAL FLUORINE

from General Chemical

Initial interest in elemental fluorine has centered largely around military and atomic energy uses. Now commercially available in tonnage quantities, fluorine is receiving increased attention for industrial purposes. For those surveying potential uses of this highly reactive material, General Chemical has prepared this condensed report.

As America's foremost producer of elemental fluorine—and sole supplier of liquid fluorine—General Chemical is well equipped to work cooperatively with users in every area—research, development, engineering, and plant scale handling.

Availability	Readily available from two producing locations: Metropolis, Ill. and Baton Rouge, La.
Forms of Shipment	As a gas, in 6 lb. net cylinders. As a liquid, in 5,000 lb. tank transports. We are also prepared to discuss "over the fence" pipeline deliveries.
Price	At present production levels, fluorine is priced substantially lower than many people have thought. Single 6 lb. cylinders: $15.00 per lb. and downward, depending upon circumstances. Tank Transports of liquid fluorine at under $4.00 per lb. Substantially lower prices would apply for "over the fence" deliveries of gas.
Materials for Handling	Handled safely in many standard materials of construction such as aluminum, copper, brass, steel, stainless steel, Monel, and nickel. We can offer constructive suggestions on preferred methods.
Literature	"Fluorine"—21 page technical data bulletin "Liquid Fluorine Unloading Procedure" "Handling Elemental Fluorine in the Laboratory"—describes safe, simple method for handling. *Available free upon request on business letterhead.*

First in Fluorine Chemistry

Allied Chemical

GENERAL CHEMICAL DIVISION
40 Rector Street, New York 6, N. Y.

Check 3244 opposite last page.

conventions and exhibits

August 10-14. Gordon Research Conference, Elastomers, Colby Junior College, New London, N. H.

August 16-21. American Pharmaceutical Association, Annual Meeting, Netherland Hilton Hotel, Cincinnati, Ohio.

August 18-21. Western Electronic Show and Convention, Industrial Design Competition, Cow Palace, San Francisco.

August 21-*September* 1. 4th International Symposium on Free Radical Stabilization, National Bureau of Standards, Washington, D. C.

August 24-28. Gordon Research Conference, Instrumentation, Colby Junior College, New London, N. H.

September 7-11. Ion Exchange Conference, Mountain View Hotel, Gatlinburg, Tenn.

September 10-11. 2nd International Air Pollution Congress, American Society of Mechanical Engineers, Statler Hilton Hotel, New York.

September 10-11. Society of Plastics Industry, Midwest Conference, French Lick, Indiana.

September 17-20. Drug, Chemical and Allied Trades Section, New York Board of Trade, 69th Annual Meeting, Sagamore Hotel, Bolton Landing, Lake George, N. Y.

September 20-22. Chemical Market Research Association, Textile Fibers—Yesterday and Today, Williamsburg, Virginia.

September 21-25. 14th Annual Instrument-Automation Conference and Exhibit, International Amphitheatre, Chicago, Illinois.

September 22-24. Industrial Nuclear Technology Conference, Morrison Hotel, Chicago, Illinois.

September 27-30. American Institute of Chemical Engineers, St. Paul, Minnesota.

September 28-30. American Oil Chemists' Society, Hotel Statler, Los Angeles.

... Meetings and shows of interest to the chemical industries

September 29-*October* 1. National Association of Corrosion Engineers, Western Regional Meeting, Bakersfield Inn, Bakersfield, California.

October 4-7. Society of Petroleum Engineers of AIME, Fall Meeting, Dallas.

October 7-9. American Vacuum Society, Sixth National Symposium on Vacuum Technology, Sheraton Hotel, Philadelphia.

October 13-14. Society of Plastics Engineers, Southern California Section, Ambassador Hotel, Los Angeles.

October 18-22. The Electrochemical Society, Inc., Deshler-Hilton Hotel, Columbus, Ohio.

October 20-24. Federation of Paint and Varnish Production Clubs, 37th Annual Meeting and the 24th Paint Industries' Show, Convention Hall, Atlantic City.

October 22-24. Acoustical Society of America, Cavitation, Cleveland, Ohio.

November 2-5. 11th Exposition of the Air-Conditioning and Refrigeration Industry, Convention Hall, Atlantic City.

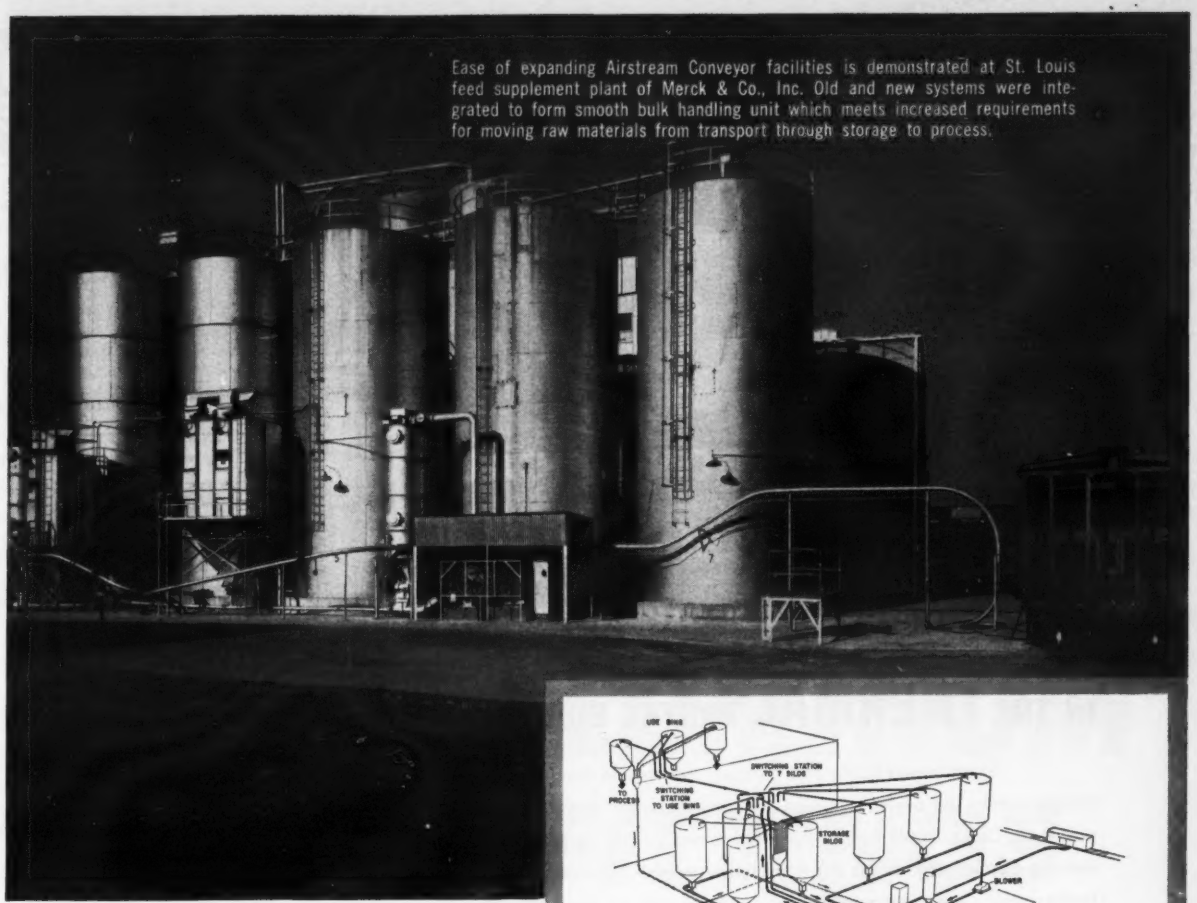
November 2-6. 41st National Metal Exposition & Congress, International Amphitheatre, Chicago, Illinois.

November 5-6. Industrial Management Society, 23rd Annual National Industrial Engineering and Management Clinic, Conrad Hilton, Chicago.

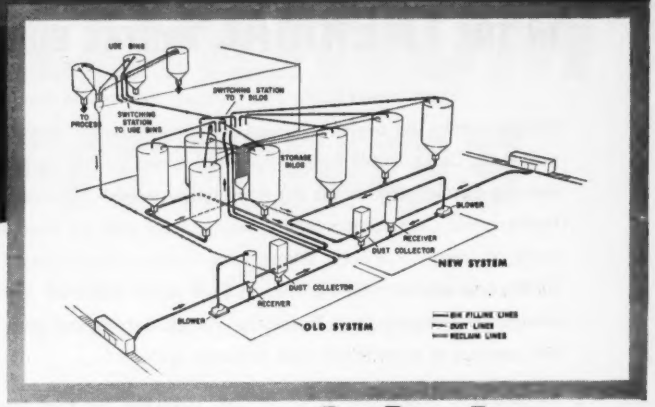
November 16-20. Fifth International Automation Congress and Exposition, New York Trade Show Building, New York City.

November 17-20. Packaging Machinery Manufacturers Institute Show of 1959 and Annual Forum, Coliseum and Statler Hotel, New York City.

November 30-*December* 4. 1959 Exposition of Chemical Industry, Coliseum, New York City.



Ease of expanding Airstream Conveyor facilities is demonstrated at St. Louis feed supplement plant of Merck & Co., Inc. Old and new systems were integrated to form smooth bulk handling unit which meets increased requirements for moving raw materials from transport through storage to process.



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Merck & Co. recently took advantage of these features when they expanded their ground level Airstream System. In addition, use of duplicate components in the new system cut engineering costs. This also simplifies maintenance and permits minimum parts inventory.

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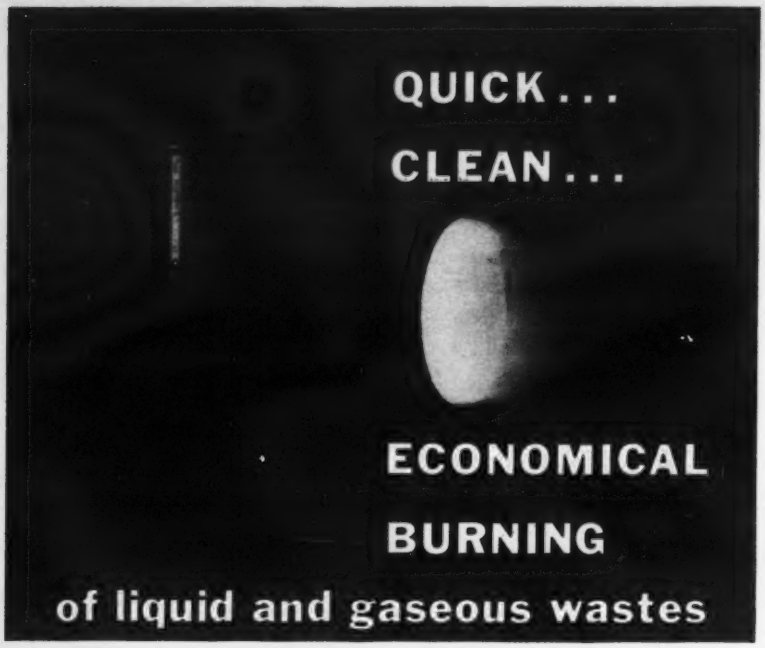

IN THE THERMAL VORTEX BURNER!

Short, clean flame and compact size make the THERMAL Vortex Burner the perfect solution to many industrial waste disposal problems. Combustible liquid and gaseous wastes can be fed directly into the burner, eliminating the need for expensive, space-consuming incinerators. Combustion takes place quickly with an absolute minimum of smoke and odor. Where necessary, a conventional fuel may be fired to supplement the firing of the waste material. Simply and compactly designed, the THERMAL Vortex Burner can also become the nucleus of an efficient heat recovery system.

THERMAL'S laboratory facilities are available for trial burning of wastes. In addition, our staff of engineers is equipped to do complete turn-key designs to solve your waste burning problems. For further information, write for Bulletin #116.

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CHEMICAL PROCESSING

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and Chemical Business

For the management team

More than 50,000 copies of this issue

Vol. 22 August 1959 No. 8

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OTHER SUBSCRIPTIONS — from "non-qualified" persons (those who are not key processing men in the chemical industries) — are accepted at $1.00 the copy, or $10.00 the year. Foreign subscriptions — subscriptions from countries outside the territory of the United States and its possessions are acceptable at $35.00 per year. Such subscriptions are not counted as "industry circulation" on BPA audit reports.

Accepted as Controlled Circulation publication at Mendota, Illinois. Publication office: 1501 W. Washington Road, Mendota, Illinois. Address all correspondence to Editorial and Executive office, 111 East Delaware Place, Chicago 11, Illinois.

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CHEMICAL PROCESSING magazine receives the National Safety Council's Public Interest award. From left to right are John C. Vaaler, CP Editor, Theodore W. Wett, Associate Editor, and Ed Alpaugh representing the Council

Can safety be habitual?

It might seem that the song title from a number of years ago, "You're Getting to Be a Habit with Me", should be everyone's theme when it comes to safe practices, and the practice of safety. But can safety actually become habitual? Or, like Alice found during part of her trip through Wonderland, must you run full speed just to hold the ground you've gained.

This year CHEMICAL PROCESSING magazine was proud to receive — for the fifth consecutive year — the National Safety Council's Public Interest Award in recognition of ". . . exceptional service to safety." We trust that our efforts on behalf of safety have helped keep you conscious of the need not to permit safety to be trusted to habit. It must be worked at . . . safety is no accident.

This month (page 135) we're introducing what we hope will be the first in an extended series of articles on "Chemical Boobytraps." Here is an excellent example of how a condition not normally considered hazardous can quickly become a deadly menace. Perhaps you can help us with this project. If you have had an experience like this, with a material not habitually considered dangerous, we would like to know about it so we can pass it along to our readers.

Theodore W. Wett

Associate Editor

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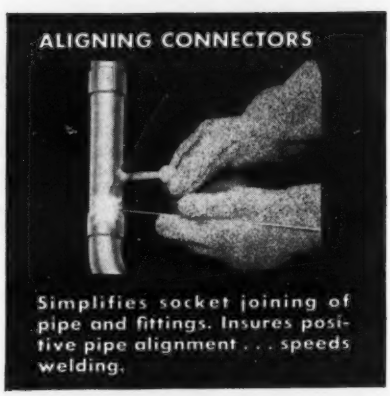

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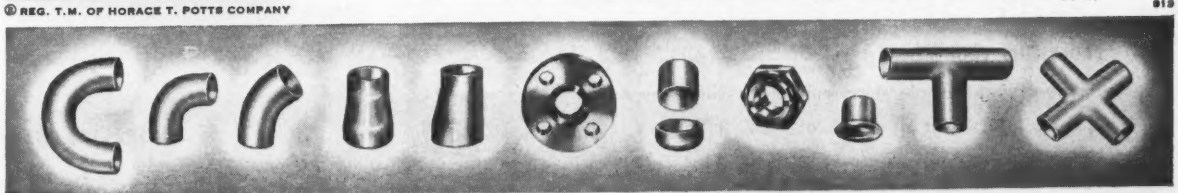

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highlights

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CHEMICAL PROCESSING

AUGUST 1959
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THIS MONTH'S COVER

There's good reason for Olin Mathieson president Osborne to be so pleased. Reorganization has helped bring about increased earnings for the company, and the road ahead looks relatively smooth. The story is told in CB Profile starting on page 23. Incidentally, that's the new Olin Mathieson trademark woven into our cover caption.

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SPECIAL READER SERVICES

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• To subscribe to this magazine see reader-qualification form opposite last page

Spotlight On People

HOWARD D. HARTOUGH is elected president of the Chemical Products Division of Chemetron Corporation.

The board of directors of General Mills has elected WILLIAM F. MITCHELL a vice president of the company. He has been general manager of the Chemical Division four years.

The newly created position of board chairman of Republic Creosoting Company and its subsidiary, Reilly Tar and Chemical Corporation, is filled with election of CARLETON B. EDWARDS to that post. PETER C. REILLY is elected president of the two companies. THOMAS E. REILLY will continue as vice president and also will serve as treasurer.

RICHARD C. McCURDY is elected a member of the executive committee of Shell Oil Company. He is president of Shell Chemical Corporation and a director of Shell Oil.

FRED POWELL is appointed president and chief executive officer of California Chemical Company, a subsidiary of Standard Oil Company of California. W. H. SHIFFLER is named vice president.

At HEF, Inc., R. WOLCOTT HOOKER is re-elected president of the corporation, owned jointly by Hooker Chemical Corporation and Foote Mineral Company. Other officers are JOHN S. GATES, senior vice president and treasurer; THOMAS F. WILLERS, secretary, and WILLIAM R. SPOFFORD, assistant secretary. Elected directors are Messrs. Hooker, Gates, Willers, DR. MARION B. GEIGER, W. FREDERICK LUCKENBACH, and WILLIAM M. RAYNOR.

WILLIAM M. HAILE is elected a vice president of Union Carbide Corporation. WILLIAM B. NICHOLSON is appointed president of Linde Company, division of Union Carbide, to succeed Haile.

VINCENT W. SUELLAU and FRANK J. FRENCH are named executive vice presidents of General Chemical Division, Allied Chemical Corporation.

American Mineral Spirits Company announces election

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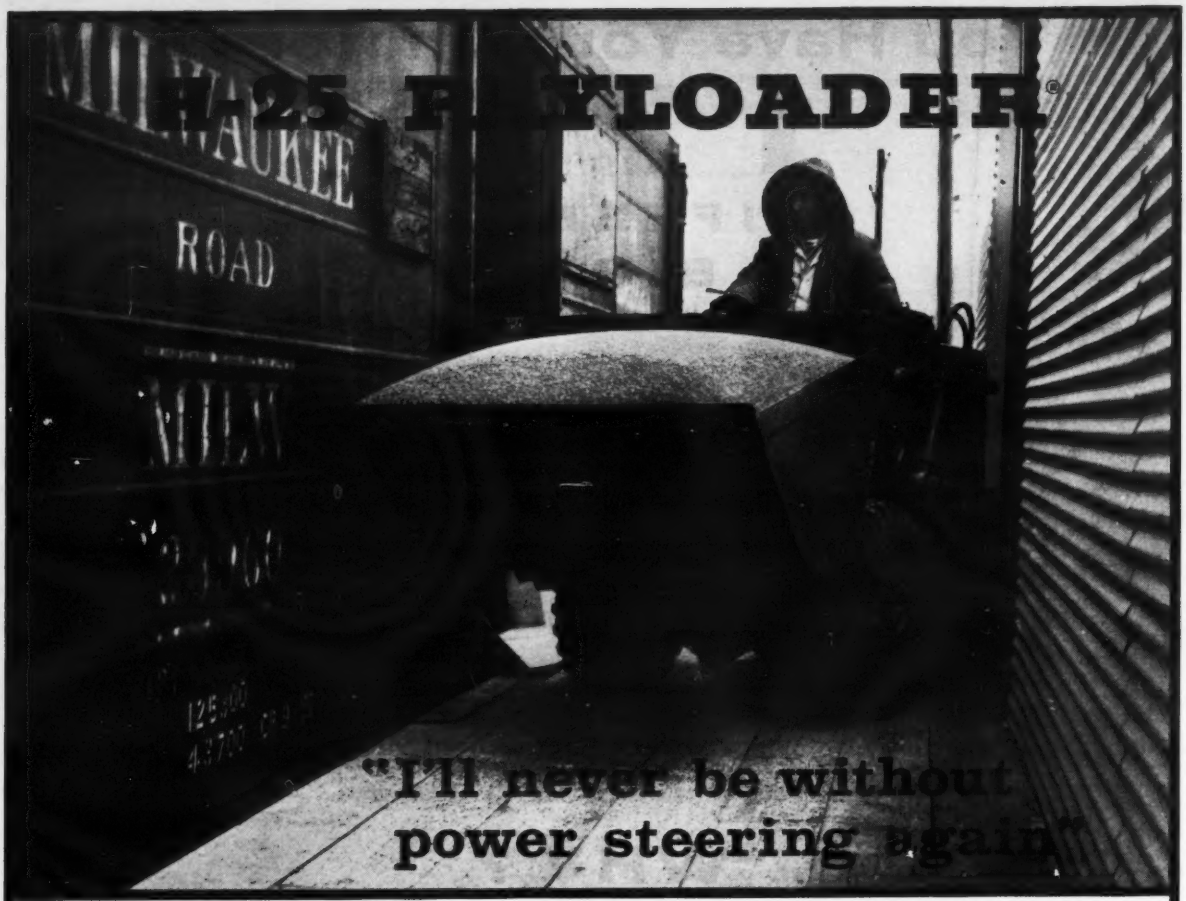

"There's no exertion and lots more maneuverability with the power-steering. It's simpler, also faster loading and getting in and out," adds Roy Forman of Lee County Service Co. of Amboy, Ill.

Whether you are doing rail car unloading or any other kind of bulk handling, the power-steer and power-shift features of the Model H-25 "PAYLOADER" spell ease of operation and fast maneuvering that move more tonnage per shift.

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PEOPLE

of RICHARD V. HINMAN and AUGUST S. HOYER as assistant vice presidents. The former also will continue as eastern sales manager.

Three new sales management positions have been created by U. S. Industrial Chemicals Co., Division of National Distillers and Chemical Corporation. WARREN E. JOHNSON becomes director of chemical sales; VINCENT D. MCCARTHY is director of plastics sales, and GEORGE H. STANTON assumes position of director of field sales later this year. THOMAS R. DRINKWATER is named manager of industrial alcohol and solvents sales succeeding Johnson.

W. RICHARD DONALDSON becomes marketing director of W. R. Grace & Co., Polymer Chemicals Division.

At Foote Mineral Company, W. FREDERICK LUCKENBACH JR. is appointed general manager of the newly created Commercial Development Department. BOYD E. CASS becomes general sales manager, and ANTHONY C. DEMOS is promoted to manager of metallurgical sales.

American Cyanamid Company announces oppointment of DR. E. L. R. STOKSTAD as research director of the Agricultural Division and A. J. WEITH as director of petrochemicals and mining chemicals research for the Organic Chemicals Division.

American Plastics Corporation, a subsidiary of Heyden Newport Chemical Corporation, announces election of JOHN A. PARSONS as executive vice president, J. WILLIAM ARPIN as vice president for engineering and development, and ELMER G. SMITH as vice president.

Corporate officers elected by Texas Alkyls, Inc. are A. R. ANDERSON, president; CYRIL C. BALDWIN JR. and ROBERT W. CAIRNS, vice presidents; A. E. ALBRIGHT, secretary; and JAMES W. KETTLE, treasurer.

DR. MAX SPEALMAN is elected vice president, production, Pacific Coast Operations, for Stauffer Chemical Co.

M. A. Vauglin (right), Director of Salon de Chimie, with CP Editor Vaaler at the Societe de Chimie Industrielle meeting and exposition in Paris, France

Editor Vaaler surveys CPI in EUROPE

JOHN VAALER, editor of *CHEMICAL PROCESSING*, has just completed a seven-week swing through Scandanavia and Western Europe. He interviewed key men in leading chemical processing industries of Western Germany, France, Italy, Switzerland, and Holland.

Societe de Chimie Industrielle

A trip highlight was the meeting of the Societe de Chimie Industrielle in Paris. His firsthand account of that conclave will appear next month.

Right now, John is putting together a feature report on his other findings for an early issue of CP. This will sum up and analyze the strides being made overseas in new processing techniques, equipment, materials, instrumentation. Emphasis will of course be on those developments of the most current interest to the chemical processing industries in the United States.

On the chemical business side of the ledger, John will report European views on tariffs, the Common Market, currency interchangeability.

Included on his itinerary were such companies as Farben-Fabriken Bayer, Knapsack Griesheim, Badishe-Anilin & Soda Fabrik, Chemische Werke Huls, Fabwerke Hoechst, Etablissements Kuhlmann, Compagnie Pechiney, St. Gobain . . . . producing such products as detergents, plastics, acetylene derivatives, synthetic rubber, dyestuffs, pharmaceuticals, and organometallics.

"A highly informative and productive trip," says John. "One that means profitable reading ahead in *CHEMICAL PROCESSING* magazine."

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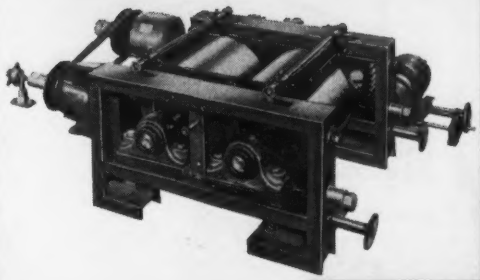

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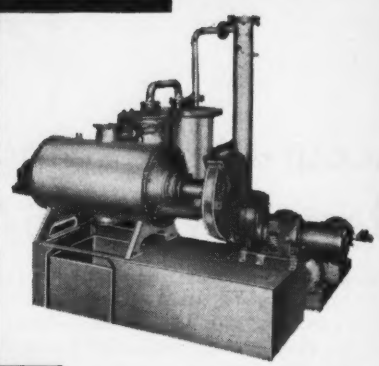

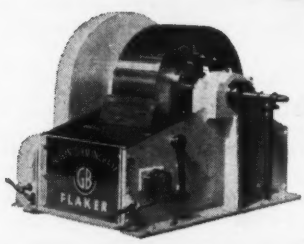

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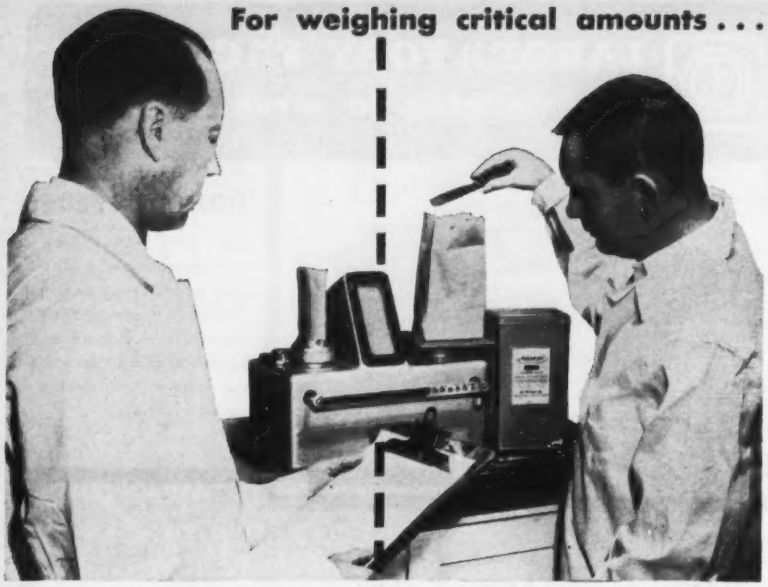

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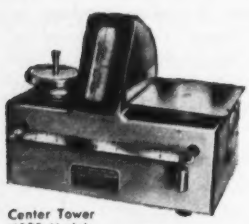
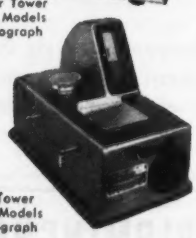


Center Tower 4200 Models Shadograph



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letters from readers

Same rules OK for small, large A-material users

Dear Sir:

I was sufficiently interested in the article entitled "Are Our A-Waste Regulations Too Tough?" by S. S. Auchincloss (July CP, page 23), to discuss it with our health physics staff, particularly Enrico Conti, chief health physicist here at Armour Research Foundation.

We recognize the desirability of reducing impediments to the use of isotopes as rapidly as possible. In some specific cases this may indeed be possible, but it does appear to us that generalizations of the sort suggested by the article may not be supportable by the present state of our knowledge.

Some random comments on the article might include:

Rules and regulations need be no different for small or large users of radioactive material. The size of the operation will partly control the cost of waste disposal. Could the cost of Tracerlab's waste disposal have been reduced to 2 percent and still maintain safe conditions?

Won't Add to Burden

State laws will not necessarily add to the burden of waste disposal problems. For example, the State of Illinois, in a bill that is coming forth from the legislature, has followed the AEC regulations to a large degree.

The regulations may be too stringent in some respects, but the commission periodically reviews its regulations and issues amendments loosening restrictions when it has been demonstrated that this can be done safely. The recent amendment to 10 CFR Part 30 indicates that the commission is making progress in this regard.

Mr. Auchincloss feels that the release of radioactive waste should be reappraised in view of the greater knowledge of the hazards involved. On a large population basis, the hazards due to radiation are now considered to be greater, not less than they were considered several years ago.

Extreme Care Cited

Parameters in sea disposal are being intensely studied and should be able to tell us the effectiveness of disposal at sea in a few years. The concept of extreme care in the total release of radioactive material with the hazardous half-lives (10-100 years) is still with us. This cannot reasonably be minimized because of the pressure of economics.

The author has answered the initial point that he raised in the beginning of the article by his closing statements. The answer to the problem of waste disposal lies in an imaginative research program developing better and more economical techniques of waste disposal.

As a result of the research and development work done on problems of waste disposal, perhaps the rules and regulations can be appreciably changed but a premature relaxation could cause irreparable harm.

L. REIFFEL
Director of Physics Research
Armour Research Foundation
Chicago, Ill.

Red tape hit in handling nuclear waste disposal

Dear Editor:

I agree with Mr. Auchincloss of Tracerlab regarding the unrealistic nature of the nuclear waste disposal regulations.

We at United States Radium Corporation handle large amounts of isotopes, but in general have only limited quantities to dispose of as waste, and the problem, while annoying, is perhaps of less economic importance to us than to certain other groups.

Problems of more importance to us are those involving the restrictions on distribution which are completely out of phase with the AEC's announced desire to distribute isotopes. The restrictions imposed by the unrealistic licensing procedures, the governmental red tape involved, and the conflict between federal, state, and local regulations, are the matters of most concern to us.

The programs appear in some areas to be developing on a practical basis, but for each area in which this occurs, some new group feels that special regulations are required and, as a result, conflicting interests and requirements make commercial promotion of the use of isotopes a confusing and somewhat hopeless proposition.

C. W. WALLHAUSEN
Vice President
United States Radium Corporation
Morristown, N. J.

Calls invention groups 'innovators in industry'

Florence Buckley, in a letter published in July CP (page 9), took issue with an article written by Dr. Donald A. Schon (January CP, page 31), calling his thoughts on group invention "unpractical." Here's Dr. Schon's reply.

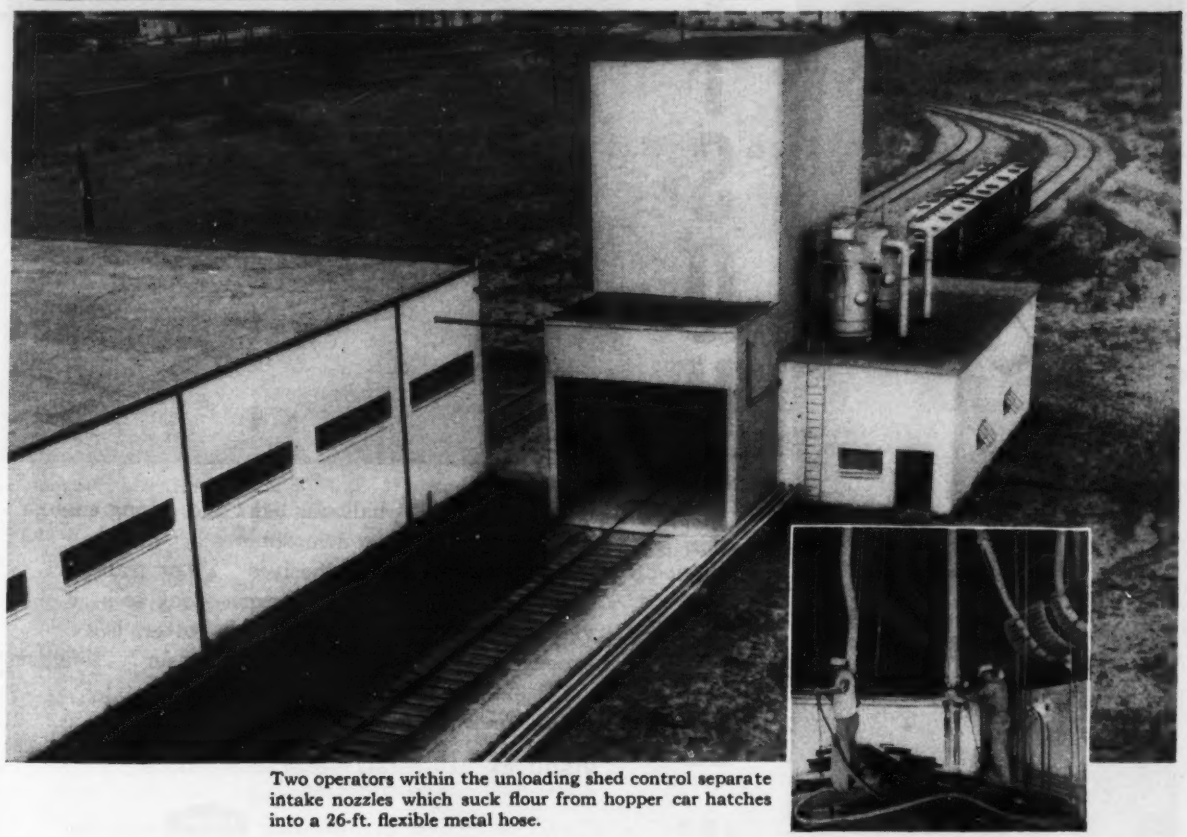
Dear Mr. Vaaler:

I do not mean here to raise again, and on the same impossible level of generality, the by now classic question of whether groups or individuals are better at invention. Stated in that way the question is unresolvable.

Certainly individuals sometimes operate effectively as innovators within industry. Also, there is no question that invention groups, such as the groups at Arthur D. Little and Kimberly-Clark referred to in my article, have proved themselves as innovators in industry.

It makes no sense to treat these as conflicting and mutually exclusive sources of new products. The interesting ques-

The Arithmetic of Materials Handling



Two operators within the unloading shed control separate intake nozzles which suck flour from hopper car hatches into a 26-ft. flexible metal hose.

Flexibility of FULLER Pneumatic Conveying Systems Makes Problem Plant Site Practical For General Mills

The proposed site of a new General Mills flour blending and packaging plant in Louisville, Ky. seemed impractical to mill engineers because of the site's long, narrow shape. Flour, delivered at a dead-end rail siding, would have to be conveyed over unusually long distances—400 feet from unloading point to storage bins.

By incorporating Fuller Airveyor® pneumatic conveying systems in the plant design, General Mills has overcome these disadvantages and has completed one of the country's most modern bulk flour handling plants.

At the new, highly-automated plant, Fuller Airveyors unload Airslide® or hopper cars of bulk flour at 40 tons an hour, flowing it 400 feet to a series of 18 silos. In a completely integrated system, other Fuller Airveyors deliver ingredients for blending, weighing, proportioning and bagging operations. The compact, 5-inch pneumatic pipelines twist and turn easily through what would be cramped or impossible quarters for other methods of conveying. Self-cleaning Airveyors, containing few moving parts, practically eliminate maintenance and industrial hazards.

Production speed, flexibility, sanitation, processing accuracy, push-button control of an entire plant—are just some of the advantages of Fuller pneumatic bulk handling systems realized at General Mills' new Louisville plant. Similar advantages can apply to old plants modernized with the help of Fuller engineering specialists. Write or phone today outlining your problem. Fuller will gladly furnish additional information with appropriate recommendations. 1107 A-269

For details on the Fuller Product line, see Chemical Engineering Catalog.

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Check 3253 opposite last page.

tions to me are:

1) In what sorts of industrial contexts are each of these devices most effective?

2) In what ways can an individual inventor use a group to increase his own productivity?

The burden of my article had to do with the latter point. It recognized that because of organizational inertia, industrial innovation frequently takes place in a hostile and resistant atmosphere in which new product ideas have to be sold and sold hard.

It pointed out that a group can frequently provide more support, prestige, and selling effectiveness to management than can an individual inventor.

This point, I think, stands regardless of how the more basic group-individual issue is resolved.

DR. DONALD A. SCHON
Arthur D. Little, Inc.
Cambridge, Mass.

Tells why investors have faith in CPI

Dear Sir:

As I see it, Mr. Young's analysis of the factors controlling the chemical industry's profit picture (July CP, page 24) is a fairly accurate one. Present short-range overcapacity in basic chemical raw materials merely reflects the long-term confidence investors have in the future of our industry.

I would strongly emphasize that the over-all acceleration in the acquisition, development, and dissemination of technological know-how simply means that we must cut down the time required to commercialize sound new products and processes. Today's bonanza may have difficulty breaking even in the chemical market place of tomorrow.

ERHART K. DRECHSEL
Commercial Development Department
Escambia Chemical Corporation
New York, N.Y.

Watching Washington

See Speed-Up in Releasing Top Secret Scientific Data

The dramatic move of Senator Thomas C. Hennings Jr. (D., Mo.) in polling 17 American Nobel Prize winners for their views on present government classification policies regarding scientific information may speed up efforts here to declassify much scientific data.

Almost to a man, winners urged greater dissemination of information. Several, like 1952 winner Dr. Selman Waksman of Rutgers, offered examples of scientific delay caused by automatic bureaucratic classification in the chemical warfare area.

In an investigation to protect man against the toxin of the castor bean—ricin—scientists produced purer preparations of ricin and two laboratories actually crystallized it. These scientific advances were hidden in the classified files for up to two years.

If the lid is lifted, many products of chemical research, such as developments of the Chemical Corps, will be made public. Today officers like Maj. Gen. William M. Creasy (U.S.A., Ret.), former Chemical Corps commander, and Brig. Gen. J. H. Rothschild (U.S.A., Ret.), former Chemical Corps research and development chief, may speak only after their retirement and their return to civilian life.

Recently, General Creasy before the House Committee on Science and Astronautics, and General Rothschild in a national magazine told the public about "psycho-chemicals" and the possibility of the development of a merciful alternative to the atomic bomb.

Third salt water plant to use electrodialysis

The government's saline water conversion program is speeding along. The Interior Department has given the green light to a third demonstration plant process—electrodialysis.

The plant, to be located in the Northern Great Plains states or the Southwest, will convert brackish water to fresh water at an anticipated rate of at least 250,000 gal/day by use of electrodialysis.

The first process, long-tube vertical, multiple-effect distillation, is earmarked for a Gulf Coast site. The second, multistage flash distillation, is scheduled for the West Coast.

A law, signed last year, authorizes $10 million for the construction of five saline water conversion demonstration plants.

Liquid bulk shipping rule changes loom

An Interstate Commerce Commission decision due this fall will decide the fate of newly developed collapsible packages for bulk transportation of liquids. The controversial product is a large container developed by United States Rubber Company.

The issue is whether a vehicle carrying such a container is thereby converted to a tank truck. If the ICC decides it is a "tank vehicle," only tank carriers then will have authority to transport the container.

U. S. Rubber contends that carrying such a container with or without freight does not create a tank vehicle. The National Tank Truck Carriers Association says the new product falls within the exclusive authority granted tank truck operators by the ICC.

In seeking clarification, the

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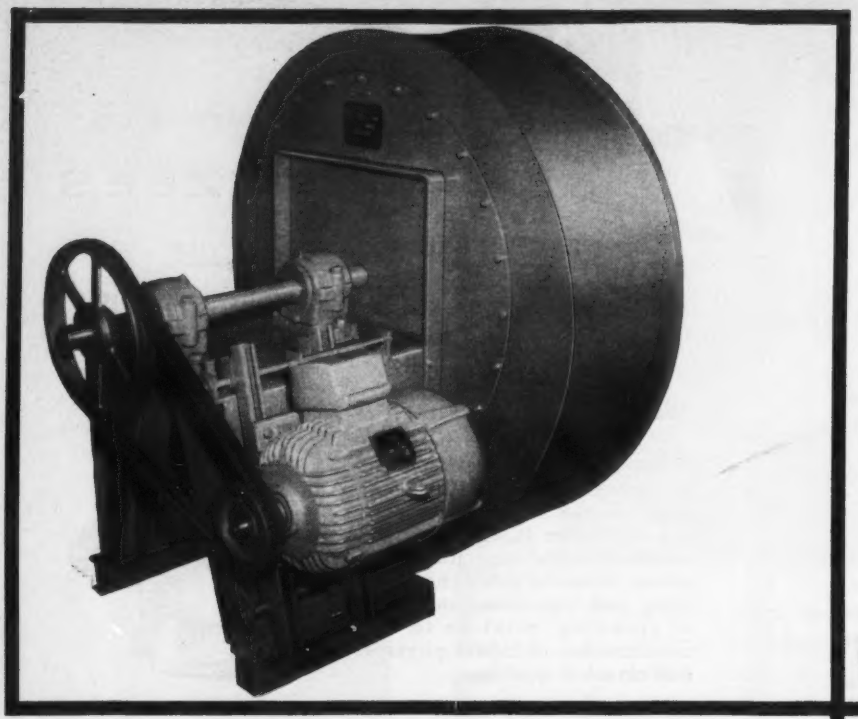

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"Buffalo" Industrial Exhausters are ruggedly built, highly efficient heavy duty fans designed for a wide variety of applications. Husky steel plate housing is welded throughout. Adjustable to any discharge direction. Reversible for clockwise or counter-clockwise rotation. Available in numerous arrangements for many severe air and materials moving jobs. These include:

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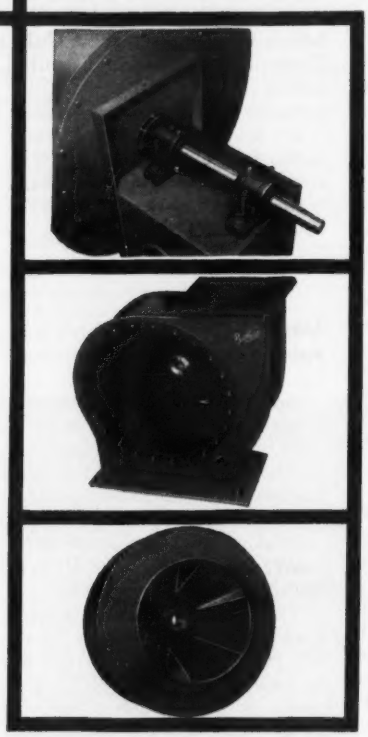
Investigate the advantages of "Buffalo" Industrial Exhausters for your severe air or materials moving jobs. Phone your "Buffalo" engineering representative, or write for Bulletin FI-110.



Upper: Heat Slinger for cooling shaft and bearings on a "Buffalo" Hot Gas Exhauster,

Center: "Buffalo" Rubber-Lined Exhauster for corrosive fume handling.

Lower: "Buffalo" Type "MW" Material Wheel.

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rubber company believes the word "bulk" should be defined as "that whereby the commodity transported is confined solely by and conforms to the carrying compartment of the vehicle itself."

This obviously would apply to liquid materials transported by tank vehicles, leaving U.S. Rubber's container outside the definition. It would be classified simply as a "package."

The "package" classification already has been applied to the container by the Motor Carrier association.

FDA plans crackdown on labeling practices

Chemical processors with food industry customers would do well to review their raw material labeling practices in light of the food additives amendment.

FDA has served notice it will crack down on manufacturers whose labels do not show pertinent ingredient information, such as the identity and quantity (in some instances) of what goes into processed raw materials.

While the law fixes responsibility on the food processor to know what he puts into food, this does not mean that the person who furnishes the raw material has no responsibility, says FDA.

When materials are shipped in bulk, complete label information should be furnished on the bill of lading or shipping invoice, the FDA points out.

J. Kenneth Kirk new assistant in FDA

Chemical processors who deal with the FDA will find a new man on the scene — J. Kenneth Kirk — in the newly created position of assistant to the commissioner for regulations making.

Kirk, former head of FDA's Boston district, will advise the commissioner and deputy commissioner on making regulations, and act as liaison man with industry and con-

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U.S.I. CHEMICAL NEWS

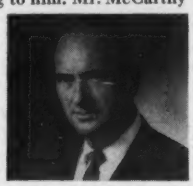
★ A Series for Chemists and Executives of the Solvents and Chemical Consuming Industries ★

New Managerial Positions Created in U.S.I. Sales

W. E. JOHNSON

Warren E. Johnson, Vincent D. McCarthy and George H. Stanton have been named to fill three new sales management positions which have just been created by U.S.I.

Mr. Johnson, who is appointed Director of Chemical Sales, will have responsibility for Industrial Alcohol and Solvents, Heavy Chemicals, Sodium and Special Products Sales, with the manager of each product group reporting to him. Mr. McCarthy as Director of Plastics Sales, will have responsibility for management of polyethylene sales, as well as other plastic materials that the company might produce in the future. Mr. Stanton, who will assume the position of Director of Field Sales later in the year, will supervise the activities of regional sales offices. The three new appointees will report to Alden R. Ludlow, Jr., Vice President in Charge of Sales.



V. McCARTHY

G. H. STANTON

"We are confident these important changes will considerably strengthen our sales organization," Mr. Ludlow says, "and enable us to keep pace with our increasing business."

The new Director of Chemical Sales, Warren Johnson, has been Manager of Alcohol and Chemical Sales for U.S.I. Vincent McCarthy, Director of Plastics Sales, has been Manager of PETROTHENE® Polyethylene Sales. And George Stanton, Director of Field Sales, has been Manager of the U.S.I. Chicago Sales Division.

All-Titanium Centrifugal Pumps and Valves Are Now Being Produced

Centrifugal pumps and valves made of commercially pure titanium have been developed to meet the ever increasing need for more corrosion resistant equipment in the chemical industry. Made to order, pumps are available in sizes from 1″ x 1″ and capacities from ½ gpm. Valves are available in a size range of 1″ through 4″, and nonlubricated and nonsticking plug valves are also available in sizes of ¼″ through 3″.

This equipment, designed in titanium specifically for the highly corrosive environments found in chemical plants, is said to be very competitive pricewise with similar units fabricated from nickel-base alloys. The titanium used is a product of Mallory-Sharon Metals, owned one-third by U.S.I.

1958 Aerosol Survey Results Are In; Production of Nonfood Units Estimated at 20% Above 1957

Hair Sprays Still Sales Leader; Dental Cream, Pet Product Sales Large Enough for Separate Statistical Categories.

At the Chicago meeting of the Chemical Specialties Manufacturers' Association this May, it was announced that an estimated 470 million nonfood aerosol units were produced in the U.S. in 1958, with an approximate value of $470 million. This is an increase of 20% over the 1957 estimate of 390 million units. Estimates are based on reports from 45% (95 out of 211) of the known aerosol fillers in the country, plus reports from container and valve makers. By comparison, CSMA estimated 320 million units in 1956, 240 million in 1955, and 185 million in 1954. Industry production has been climbing steadily over the eight years in which surveys have been made, and has been very rapid when compared to most other industries.

The actual number of units reported for 1958 was 341,383,496. For the third consecutive year, hair sprays were in undisputed first place, accounting for 27% of the total units reported. Although only 92.6 million hair spray units show up on the survey, CSMA believes that over 100 million were actually produced. Room deodorants were reported at 49.8 million units, which indicates a continued growth. The 1957 reported figure was 42 million. CSMA believes that insect sprays, room deodorants, coatings and shaving lather were all actually produced in excess of 60 million units last year, although the reported figures are considerably lower.

Two New Statistical Categories

Dental cream, treated for the first time as a separate category, showed 12.9 million

MORE

NONFOOD AEROSOLS REPORTED IN 1958 COMPARED TO 1957

(figures in millions of units)

Product	1958	1957
Hair Sprays	92.6	94.4
Room Deodorants	49.8	42.0
Shaving Lathers	45.3	50.9
Insect Sprays	42.3	41.5
Coatings	30.1	36.5
Colognes & Perfumes	13.6	17.9
Dental Creams	12.9	*
Household Products Other Than Room Deodorants	25.9	28.1
Personal Products Other Than Hair Sprays, Shaves, Dental Creams, Colognes & Perfumes	14.5	12.4
Miscellaneous	14.4	15.6
TOTALS	341.4	339.3

*not reported separately in 1957

Researchers Uncover More Uses of Methionine in Body

Recent work with radioisotopes by the Biology and Medicinal Division of the Argonne National Laboratory has revealed that methionine in the body, when converted to adenosylmethionine, can participate in epinephrine synthesis; react with niacin; enter the brain; and help form spermine, ergosterol and histamine.

New Ultraviolet Absorber Developed for Polyethylene

A new compound now in the process development stage has recently been made available to polyethylene manufacturers for evaluation as an ultraviolet absorber. The material — 2,2′-dihydroxy-2-n-octoxybenzophenone — is compatible with polyethylene because of the long n-octyl chain, and it is said to absorb strongly in the 300-375 millimicron UV range.

In field tests made by the producer with 10-mil polyethylene film, it was found that incorporation of 0.171% by weight of the absorber was adequate to retain 85% elongation after two months' use in an area of strong sunlight.

Currently, carbon black is the only effective UV absorber compatible with polyethylene and used to protect the plastic in outdoor service. The new compound is a pale yellow powder and, if proven successful in practical application, will permit the outdoor use of clear and colored polyethylene goods.

New System Developed For Extruding Metallic Sodium in Wire Form

For many reactions, where small amounts of sodium in wire form are required, there has long been a need for equipment capable of producing wire from the standard one-pound cylindrical sodium brick, with minimum loss and effort.

MORE

U.S.I. CHEMICAL NEWS

CONTINUED

Aerosols

units. Again, the reported figure is believed to be substantially less than the number of units actually produced. Veterinarian and Pet Products, the other new category on the questionnaire, showed a reported figure of 3 million units. Serious consideration was given by the CSMA committee to the inclusion of food products in the 1958 survey. However, after careful weighing of the various factors involved, it was decided to postpone inclusion until 1959.

U.S.I. Products Used in Aerosols

Two U.S.I. products, ethyl alcohol and polyethylene, have played an important role in the steady growth of the aerosol industry. Anhydrous ethyl alcohol is virtually a universal ingredient in hair sprays, room deodorants, perfumes and colognes, and is widely used in other personal products and in pharmaceuticals now sold in aerosol form. Polyethylene is an important component in packaging, being used for dip tubes and valve parts. U.S.I. provides nationwide distribution of these products, and technical assistance on their use.

Aerosol industry leaders predict a continued rise in the sales curve. One of the largest makers of containers forecast recently that total production of aerosols should reach 555 million units this year.

Ethyl Alcohol Permits Two-Color Dyeing Effects On Cotton-Acetate Fabrics

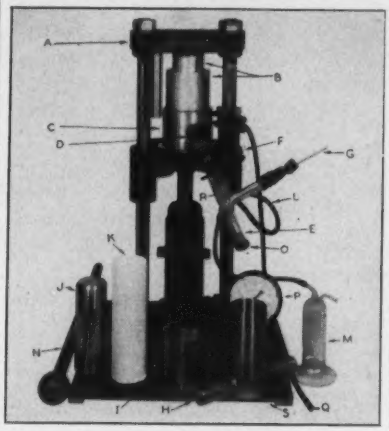
It is reported that in the vat dyeing of cotton-acetate fabrics, ethyl alcohol has been employed to achieve two-color effects by differential swelling of fibers. The fabric is treated at 40°C in a weak alkaline solution containing vat color and 70% ethanol in equal parts.

The acetate fibers are said to take the dye strongly, while the cotton fibers remain practically undyed. Cross-dyed effects can be achieved by dyeing the cotton in a subsequent bath without ethanol. The ethyl alcohol acts by swelling the acetate fibers and depressing any swelling of cotton.

CONTINUED

Sodium Wire

Researchers at the U.S.I. laboratories in Cincinnati have recently developed such a system, which is described completely in a technical data sheet now available. A photograph of the system, with descriptive legend, appears below. Any laboratory press capable of delivering 10-15,000 psi is suitable.



System for extruding sodium wire: (A) press; (B) body & plunger, 2¼" mold; (C) die assembly; (D) die plate holder & adapter; (E) adapter for cutting sodium wire; (F) clamp; (G) sodium wire cutter; (H) cutter for cleaning oxide layer from feed stock; (I) & (J) bar & knockout rod for pushing plunger from mold body; (K) sodium feed stock; (L) tube for inert gas blanket; (M) bubbler indicating inert gas flow; (N) press oil-pump handle; (O) stopper (when tube not in use); (P) pressure gauge; (Q) inert gas inlet tube; (R) sodium wire.

Sodium wire extruded in this equipment can be used, as an example, for a standard Bouveault-Blanc reduction of diethyl sebacate to decamethylene glycol. In this reaction, carried out with sodium in a considerable excess of absolute ethanol at 85-95°C, the sodium must be added slowly because of its great reactivity with ethanol at the temperatures required. The extruded wire form is ideal for the purpose. Procedure for this reduction is described in detail in the U.S.I. technical data sheet entitled: "Laboratory Production and Use of Sodium Wire," which is obtainable upon request.

TECHNICAL DEVELOPMENTS

Information about manufacturers of these items may be obtained by writing U.S.I.

Industrial glycols are treated comprehensively in new 80-page booklet now available. Use as antifreezes, coupling agents, humectants, liquid coolants, resin intermediates, solvents described. Properties, handling included. **No. 1490**

A gas chromatography abstracting service has been formed to keep subscribers up-to-date on current developments. Foreign and U.S. journals are searched and technical papers reviewed. Abstracts are submitted on punched cards. **No. 1491**

N-ethyl- and N-methylmorpholine are now being offered as stabilizers for chlorinated hydrocarbons, catalysts for urethane foams, and to prepare corrosion inhibitors, waxes, all emulsifiers and drugs. **No. 1492**

Newly revised chemical elements wall chart now being sold includes newly adopted symbols such as Ar for argon, Es for einsteinium; technical uses of many elements; latest values for atomic weights and other numerical constants. **No. 1493**

Vitamin B_6 is subject of new 40-page brochure. This condensed, up-to-date report gives nutritional and clinical data, plus a review of the chronology, chemistry, pharmacy and occurrence in nature of the vitamin. **No. 1494**

To study animal behavior in response to stimuli, complete range of automatically-recording test equipment is now on market. Permits evaluating effects of psychotropic agents, tranquilizers, sedatives, stimulants, euphoriants. **No. 1495**

New creams said to protect against virtually any skin irritant commonly encountered in industry have been developed. Contain hexachlorophene for bacteriological, anti-fungus effects. Emollient prevents drying, cracking. **No. 1496**

New first aid aerosol spray is claimed to combine antiseptic, germicide, surface anesthetic, surgical dressing and fungicide, all in the one product. **No. 1497**

Synthetic bergamot oil, believed to be first essential oil ever produced entirely and successfully by chemical means, has been announced. Said to have advantages of low and consistent cost, dependable supply, uniformity, freedom from impurities, improved stability. **No. 1498**

New filter paper now being offered is thin plastic (cellulose ester) with millions of tiny pores. Resistant to heat, chemicals; biologically inert. Said to permit large-scale microfiltration to previously unobtainable standards of cleanliness. **No. 1499**

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Alcohols: Ethyl (pure and all specially denatured formulas); Anhydrous and Regular Proprietary Denatured Alcohol Solvents SOLOX®, FILMEX®, ANSOL® M, ANSOL PR.

Organic Solvents and Intermediates: Normal Butyl Alcohol, Amyl Alcohol, Fusel Oil, Ethyl Acetate, Normal Butyl Acetate, Diethyl Carbonate, DIATOL®, Diethyl Oxalate, Ethyl Ether, Acetone, Acetoacetanilide, Acetoacet-Ortho-Chloranilide, Acetoacet-Ortho-Toluidide, Ethyl Acetoacetate, Ethyl Benzoylacetate, Ethyl Chloroformate, Ethylene, Ethyl Sodium Oxaloacetate, Sodium Ethylate, Urethan U.S.P. (Ethyl Carbamate), Riboflavin U.S.P.

Pharmaceutical Products: DL-Methionine, N-Acetyl-DL-Methionine, Urethan USP, Intermediates.

Heavy Chemicals: Anhydrous Ammonia, Ammonium Nitrate, Nitric Acid, Nitrogen Fertilizer Solutions, Phosphatic Fertilizer Solution, Sulfuric Acid, Caustic Soda, Chlorine, Metallic Sodium, Sodium Peroxide.

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Animal Feed Products: Antibiotic Feed Supplements, Calcium Pantothenate, Choline Chloride, Special Liquid CURBAY, Menadione (Vitamin K_3), DL-Methionine, MOREA® Premix, Riboflavin Products, U.S.I. Permadry, Vitamin B_{12} Feed Supplements, Vitamin D_3.

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sumer representatives on proposed regulations.

His area of work will include food standards, tolerances for pesticides and food additives, safety clearances for new drugs, various certifications, and interpretive regulations under the general provisions of the Food, Drug, and Cosmetic Act.

Atomfair box score

The 1959 Nuclear Congress and Atomfair held in Cleveland attracted more than 5000 persons. Over 1500 took part in the technical meetings. The 1960 event is slated for April 3-8, 1960 at New York City's Coliseum.

Nuclear liability problem discussed in report

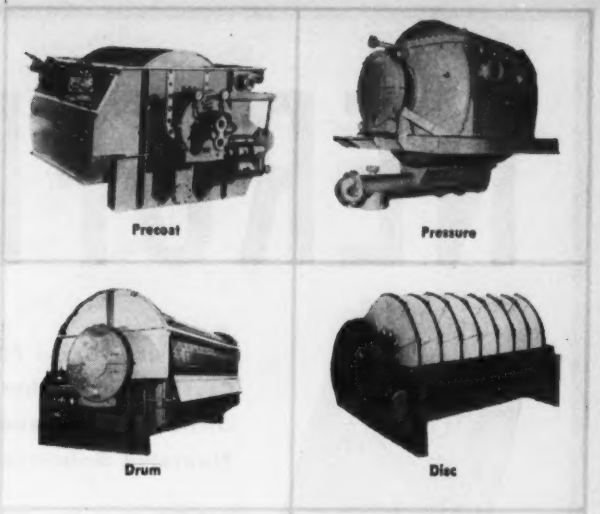
Suggested methods for solving the international nuclear liability problem are contained in a recently published 104-page report. It is recognized that damage of catastrophic proportions might occur abroad in the operation of atomic power facilities and related nuclear installations.

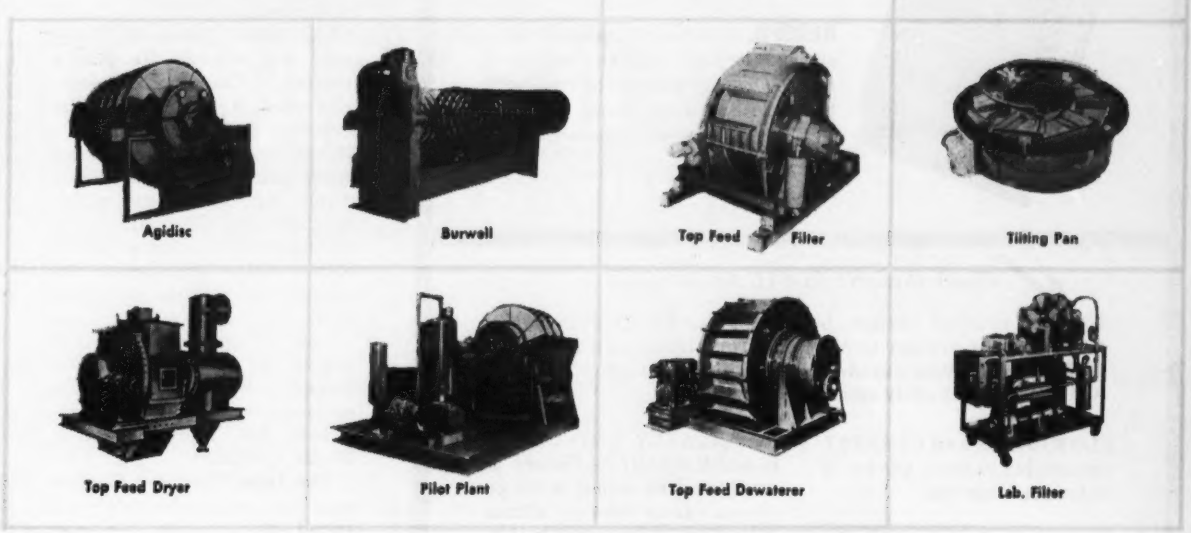
Report cites approaches by which risk of loss could be so allocated as to give reasonable protection to the exposed public while not obliging atomic enterprises to risk an intolerable burden of liability. Report is based on study conducted under auspices of the Atomic Industrial Forum and Harvard Law School.

("International Problems of Financial Protection Against Nuclear Risk" may be obtained by sending $6.00 to Atomic Industrial Forum, 3 East 54th Street, New York 22, New York.)

For more information on product at left, specify 3256 . . . see information request blank opposite last page.

EIMCO®
Continuous Vacuum and Pressure FILTERS





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As chemical processing technology has become more complex, so have the requirements of filtration. It is not surprising that many processing engineers are bewildered by the many separate types of vacuum and pressure filters available.

New products, new methods, new high demands for increased production and lower costs have created a need for modern equipment capable of higher recoveries . . . able to filter finer particles . . . designed for automatic or semi-automatic operation.

That's why it's such a big advantage to be able to choose a filter from the wide Eimco line. Full-range type and size availability assures you of maximum suitability of equipment. Highest filtration efficiency can be obtained in no other way.

The Eimco representative in your area can help you specify the filter most suitable for your job, and can make available Eimco's complete scientific facilities for pre-testing your materials. Ask him, or write Eimco, for new Filter Bulletin F - 2049.

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Check 3257 opposite last page.

NEROFIL

The Carbon-Based Filteraid for Caustic, Acid, Sulphur and Other Difficult Filtrations such as Fluorated Solutions.

NEROFIL, available in 6 grades to meet all needs for high clarity and fast flow-rate, is produced and sold by the Great Lakes Carbon Corp. whose Dicalite Dept. long has been a leader in the filtration industry.

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Not just crushed carbon, but a genuine filteraid specially processed for greater porosity and maximum surface area, NEROFIL is giving excellent results where no other filteraid had ever been entirely satisfactory.

FLOWRATES and CLARITY comparable to many grades of diatomite filteraids.

FILTERAID SAVINGS UP TO 20% because of Nerofil's lower cake density and high porosity.

READILY WETTABLE in either aqueous or non-aqueous solutions.

PHYSICALLY AND CHEMICALLY STABLE – Nerofil is unaffected by either acids or alkalis – tests show no silicon solubility in 50% sodium hydroxide at 125°F in 30 minutes.

FILTERCAKE IS COMBUSTIBLE, with a fuel value of 13,000 BTU per pound. Metals values recovery is thus easy, and disposal is no problem.

Excellent for Filler use, too | **TREMENDOUS SURFACE AREA** of Nerofil, plus its other properties, give it definite advantages as a filler in resins, cements, etc., as a catalyst carrier, in foundry applications and other uses.

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Yes, I'd like information on Nerofil for ☐ ***Filtration*** ☐ ***Other Use***

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Check 3258 opposite last page.

Acrylic Acid and Esters Plant Being Built by Dow Badische

The Dow Badische Chemical Company expects to begin production next January of acrylic acid and methyl, ethyl, butyl, and other acrylic esters in a plant now under construction near Freeport, Texas.

Acrylic acid will be produced as a 94 percent technical grade. It will be manufactured by a direct process developed by Badische. Esters will be made by esterification with methyl, ethyl, butyl, and other alcohols.

The Dow Chemical Company will market the plant's products. Company spokesmen said it is expected the technical grade of acrylic acid will be sold for use as an intermediate in production of higher acrylic esters, which normally are not available on the commercial market. Dow's Plastic Sales Department has sample quantities available now.

Dow Badische is owned jointly by Dow and BASF Overzee, N. V., a subsidiary of Badische Anilin- & Soda-Fabrik AG, Ludwigshafen a. Rhein, Germany.

The Dow Chemical Company has announced it will spend $12 million for new construction in the first expansion of its Louisiana Division at Plaquemine, La., on the west bank of the Mississippi River.

Included in the program is a polyethylene plant scheduled to go on stream before the end of 1960, and facilities to produce vinylidene chloride and an inhibited methyl chloroform used as an industrial solvent and as a propellant in aerosol sprays. Production target date for the latter units is mid-1961.

Dow also plans to build a polyethylene film plant near Fresno, Calif., with completion expected early next year.

The company also announced it has doubled its polyethylene capacity for the second time in a year with completion of a new plant at Freeport, Texas. And construction is being speeded on a polyethylene plant in Bay City, Mich., which will produce high-density material under the Ziegler process.

Reichhold Chemicals, Inc. has begun production in the first phase of its new synthetic resin plant at Houston, which represents an investment of about $1 million. Polyester resins and alkyd resins comprise the initial production.

Olin Mathieson Chemical Corporation is planning to invest more than $6 million at its Niagara Falls, N. Y., chemical facilities. The money is earmarked for installation of new electrolytic cells for the production of chlorine and caustic soda.

Also near Niagara Falls—at Model City—work is winding up on construction of a high energy fuels plant built for the Air Force. Production is expected to begin in fall.

The company has placed on stream at the Doe Run, Ky., organic chemical plant a new facility to manufacture oil additives.

W. R. Grace & Co.'s Cryovac Division is building a $2-million addition to the plant at Simpsonville, S. C. Completion is scheduled for 1961. This marks the second major expansion since the plant was completed four years ago.

General Electric Company's Chemical Materials Department has announced construction will begin soon on a plant at Mount Vernon, Ind., to produce polycarbonate resin. Facility is expected to be on stream the latter part of 1960.

National Starch Products Inc. has changed its name to National Starch and Chemical Corporation.

To page 18

THAT'S INTERESTING

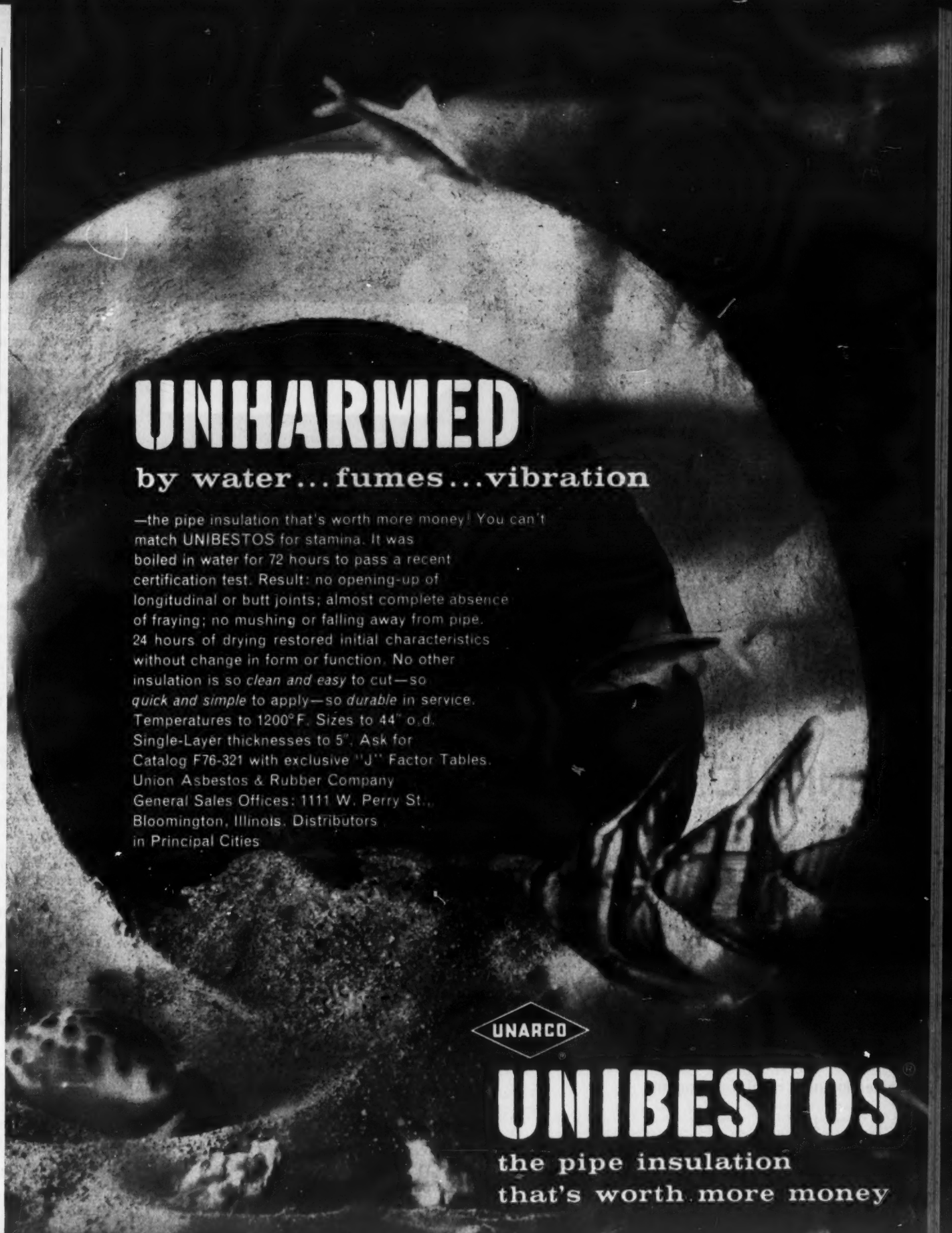
Fore!

There's little excuse now for not keeping an accurate golf score. Wakmann Watch Co., Inc., recently introduced a scorekeeper to be worn on the wrist. Precision-made by Swiss craftsmen, the device is wafer-thin, is available in five colors with a matching waterproof plastic strap.

Keeping abreast

Latest technical developments from USSR now are available in English translation in form of a Russian Patent Bulletin issued monthly. Bulletin consists of patents announced and published each month in Russia. Title and complete text of every chief claim for each newly released patent is given in four different fields.

For more information on product at right, specify 3259 see information request blank opposite last page.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—the pipe insulation that's worth more money! You can't match UNIBESTOS for stamina. It was boiled in water for 72 hours to pass a recent certification test. Result: no opening-up of longitudinal or butt joints; almost complete absence of fraying; no mushing or falling away from pipe. 24 hours of drying restored initial characteristics without change in form or function. No other insulation is so *clean and easy* to cut—so *quick and simple* to apply—so *durable* in service. Temperatures to 1200°F. Sizes to 44" o.d. Single-Layer thicknesses to 5". Ask for Catalog F76-321 with exclusive "J" Factor Tables.
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It's industry's first cationic starch. Name: CATO.® It carries a cationic charge as an integral part of its polymeric structure. A strong affinity for negative surfaces results. As demonstrated by migration to the cathode of an electrophoresis cell.

CATO has other unusual starch properties, including greater clarity and increased stability. New applications appear month after month. As a **size • stabilizer • binder • thickening agent • flocculant • retention aid • reenforcing agent.**

CATO is now in production use in paper, textile and other industries. It may well answer some special need in your product or process. We'd be pleased to tell you more about CATO. Write, telling us something of the use you have in mind.

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Check 3260 opposite last page.

CHEMICAL BUSINESS

From page 16

The Du Pont Company's new plant at Memphis for the manufacture of a new odorless household bleaching agent —a monopersulfate compound —is now in production. Facility is located on site of Du Pont's hydrogen peroxide plant, which produces the basic material from which the agent was developed.

Du Pont also has opened a multi-million-dollar cellophane plant in Tecumseh, Kan. It has an annual capacity of 50 million lb, 60 times that of the first cellophane plant opened in Buffalo in 1924.

AviSun Corporation, an equally owned affiliate of American Viscose Corporation and Sun Oil Company, will build a polypropylene film plant having a capacity of 10 million lb a year near New Castle, Del. Completion is scheduled for this fall.

American Cyanamid Company's Fine Chemicals Department has created a "custom-made" pharmaceutical production service for ethical and proprietary drug manufacturers. Specialized equipment and bulk chemicals used to produce finished pharmaceuticals or for individual processing operations will be made available to manufacturers.

The Atlantic Refining Company announces completion at its Philadelphia refinery of one of the world's largest MEK dewaxing-deoiling plants for the manufacture of paraffin waxes. Rated capacity is more than 216 million lb a year of paraffin waxes of low oil content. The 4.2-acre plant and its adjoining offsite storage, slabbing, and packaging facilities cost approximately $18 million. Construction was handled by Badger Manufacturing Company.

Monsanto Chemical Company's Inorganic Chemicals Division has initiated the first phase of a long-range expansion program at its elemental phosphorus plant in Columbia, Tenn. Work on the initial phase is expected to be com-

pleted early in 1960 on installation of facilities to prevent air and stream pollution as well as other facilities for preparation and processing of phosphate rock into elemental phosphorus.

Shell Chemical Corporation has completed new facilities at Houston which increase by 50 percent the capacity of the plant to produce bisphenol-A.

Union Carbide Corporation's Union Carbide Chemicals Company division has doubled polyether polyol production capacity at its South Charleston, W. Va., plant.

The Linde Company division is planning to break ground next month at Torrance, Calif., for a new liquid hydrogen plant—the third major "space age" construction announced by Linde in the past year. The plant will be capable of producing in excess of five tons of liquid hydrogen a day.

At Pittsburg, Calif., Linde's new multi-million-dollar liquid oxygen plant went into production about a month ahead of schedule. It has a daily output of 165 tons.

Texas Gulf Sulphur Company, Devon-Palmer Oils, Ltd., and Shell Oil Company, Canada, Ltd., joint owners, have placed on stream at Okotoks, Alberta, a new sour-gas processing and sulfur extraction plant which has a daily rated capacity of 370 long tons of sulfur. Texas Gulf Sulphur is operating the plant.

HEF, Inc. has started production at its new ammonium perchlorate plant in Columbus, Miss. Initial capacity is approximately 4 million lb a year.

Kaiser Aluminum & Chemical Corporation has completed a 5350-ft salt brine well which enables its caustic-chlorine plant at Gramercy, La., to operate at its rated capacity of 114 tons of caustic soda and 100 tons of chlorine a day.

The company announced production is under way at its $70-million alumina plant, also at Gramercy. Operation

To page 21

OXYGEN IS FACTOR IN BREAKDOWN OF MANY DIFFERENT PRODUCTS

Causes Rancidity, Gum-Formation, Embrittlement, Discoloration

USE OF ANTIOXIDANTS IS GROWING

Reports from agricultural and industrial fields indicate increased recognition of ubiquitous oxygen as a destructive threat to products containing fats, oils, waxes, hydrocarbons, plastics or rubber. Oxidation manifests itself in a variety of ways... as rancid lard, stale potato chips, unpalatable animal feed, gummed up gasoline, and cracked tire sidewalls. To combat the attack of oxygen, many companies are turning to antioxidants. Addition of these inhibitors in only very small amounts provides long-lasting protection against oxidative deterioration.

Lard is typical of food products needing protection against oxygen. Antioxidants effectively and economically retard decomposition that would otherwise result in poor color, aroma, taste or texture. Similarly, in baked products such as crackers, and in fried foods such as potato chips, antioxidants inhibit product deterioration, making complaints of rancidity a thing of the past.

Shelf life is increased when antioxidants are added to a fat-containing food, permitting distribution to be broadened to markets previously inaccessible.

Typical of the increasing importance of antioxidants is their role in helping to develop an entirely new outlet for inedible fats and oils ... animal feed. By stabilizing the fats in the feed and thus keeping the feed fresh and palatable, antioxidants were instrumental in creating a market for more than 300 million pounds of fats annually.

Antioxidants are used to retard formation of power-robbing gums in automotive gasoline and jet fuels. In transformer and turbine oils, antioxidants prolong the useful life of the oils by increasing their resistance to high-temperature oxidative reactions that build up sludge. Lower maintenance costs resulting from their use are an extra benefit for the electrical industry.

In the field of plastics, antioxidants are effective in protecting molded and extruded polyethylene against deterioration during both processing and use.

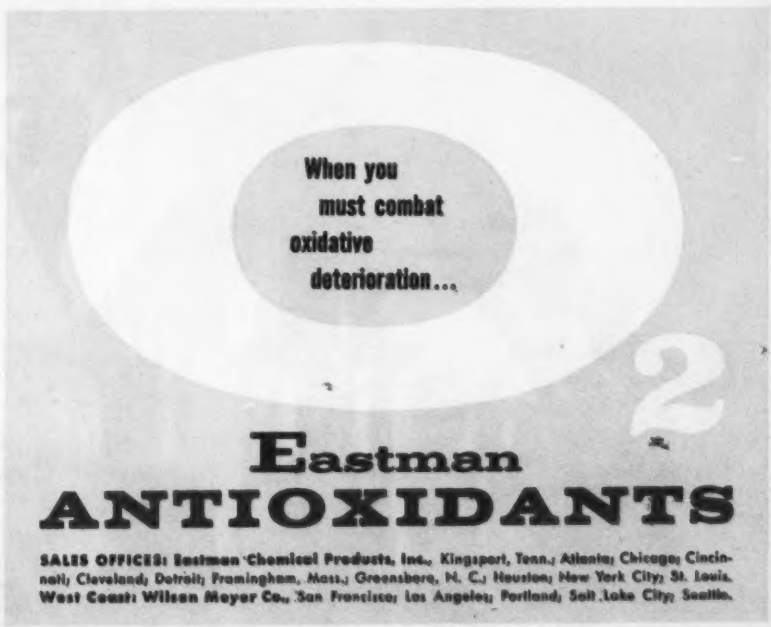
Rubber products also need protection against oxygen... actually against ozone, one of the most powerful and insidious oxidizing agents known. Even minute concentrations in the atmosphere can severely damage rubber products in a short time. To retard the cracking and checking caused by ozone, rubber processors depend on antiozonants.

In the field of agriculture, antioxidants extend the usefulness of insecticide formulations. In poultry feeds antioxidants help chicks to mature faster by protecting vitamin content, stimulating growth, improving pigmentation, and preventing certain deficiency diseases.

The best advice this report can give to manufacturers seeking to protect their products against the attack of oxygen is to seek out a leading supplier of antioxidants, for example, Eastman Chemical Products, Inc., as their laboratories are staffed with antioxidant specialists, ready to help you explore the benefits, use and cost of antioxidants in your product. Moreover, because Eastman manufactures all the principal antioxidants used commercially and have years of experience in this field, they are in the best possible position to offer unbiased constructive advice. You can get more information on the proper use of antioxidants by writing Eastman Chemical Products, Inc., subsidiary of Eastman Kodak Company, Kingsport, Tennessee.

Products in these fields know the value of Eastman antioxidants

Food	Insecticides
Rubber	Animal Feeds
Plastics	Hydraulic Fluids
Petroleum	Transformer Oils
Vegetable and Animal Oils	


When you must combat oxidative deterioration...
Eastman
ANTIOXIDANTS
SALES OFFICES: Eastman Chemical Products, Inc., Kingsport, Tenn.; Atlanta; Chicago; Cincinnati; Cleveland; Detroit; Framingham, Mass.; Greensboro, N. C.; Houston; New York City; St. Louis. West Coast: Wilson Meyer Co., San Francisco; Los Angeles; Portland; Salt Lake City; Seattle.

Check 3261 opposite last page.

From CARBIDE'S Solvent Center . . .

Solvents to fit your formulation —just specify the properties you need

Among the high-quality glycol-ethers, esters, alcohols or ketones available from CARBIDE, there is one—or a combination—that is just right to give your product the best balance between cost and performance.

Your solvent might be one—or several—of CARBIDE's 11 CELLOSOLVE and CARBITOL glycol-ethers. Their non-foaming property, high solvent power, low viscosity and low degree of odor make this group of solvents suitable for use in easy-spreading, color-retaining latex paints. If you use esters in your formulation or process — you have a choice of 25 CARBIDE esters — for example, ethyl acetate, isopropyl acetate, or butyl acetate. And, for a wide range of applications—from lacquers to drug extraction—there are two dozen alcohols and 14 ketones available from CARBIDE.

Whatever your product, there is a trained Technical Representative ready to help you select the solvent that's best for your application. You can balance your inventory and production schedules by ordering the quantities you need, quickly shipped in drums—LCL or carload lots, in tank wagons, in compartment tank cars, or 4,000 to 8,000-gallon tank cars from one of our warehouses, bulk storage stations, or plants—a total of 72 shipping points—across the country.

To help you choose the best solvent, coupler, plasticizer or diluent for your requirements, we've prepared a six-page booklet, the "Solvent Selector." Ask for a copy from your Technical Representative or write Union Carbide Chemicals Company, Division of Union Carbide Corporation, Room 328, Dept. HP, 30 East 42nd St., New York 17, N. Y.

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DATA SAVERS

CP's Processing and Engineering Data Section is for you!
Each month, this section contains time-saving nomographs, tables, or charts which other data savers have found extremely useful in speeding calculations. They have been sent to us by our many readers.
Perhaps, you will find them to be of value to you.
A wide variety of information can be found in this section. So, no matter what your particular field you will find suitable data to aid you in your daily work.

And —

the section pages are designed to fit easily into regular data files.
Keep them handy for use in making quick calcualtions in the plant or office.
Just cut along the marked edge, punch as indicated, and insert them into your notebook.

So —

be sure not to miss this month's "Data" Section. It begins on page 41.

For more information on product at left, specify 3262 see information request blank opposite last page.

From page 19

of the works, which has an annual capacity of 430,000 tons of alumina, marks completion of a $400-million expansion program begun in 1955.

Air Reduction Company, Inc. has announced construction is under way on a $3-million liquid oxygen, nitrogen, and argon plant in Richmond, Calif., by its Air Reduction Pacific Company division. The plant will produce 30 tons of the liquid materials daily. It is expected to be completed by the end of this year.

Stauffer Chemical Company's Nyotex Division plant in Houston now is shipping aluminum fluoride from a new plant addition which has a capacity of 10,000 tons a year. The aluminum compound is the first fluoride to be made by Stauffer.

Armour and Company has purchased the nitrogen plant of Mississippi River Fuel Corporation near Festus, Mo. The plant, which will be expanded, produces approximately 240 tons a day of anhydrous ammonia.

Coincident with announcement of the purchase, the firm said it had formed the Armour Agricultural Chemical Company as a division.

Dixon-Western Chemicals, Inc. has been formed by Dixon Chemical & Research, Inc. and American Sulphur & Refining Company. The jointly owned company plans to build a 500-ton-a-day sulfuric acid plant in Sulphurdale, Utah—the initial step in an over-all chemical complex that will cost approximately $3.5 million.

Koppers Company, Inc. has purchased the Halowax plant of Union Carbide Corporation at Wyandotte, Mich. The facility produces chlorinated naphthalene, chlorinated paraffin, and other chlorinated chemicals and resins. The plant will be operated by Koppers' Tar Products Division.

A. E. Staley Manufacturing Company's board of directors

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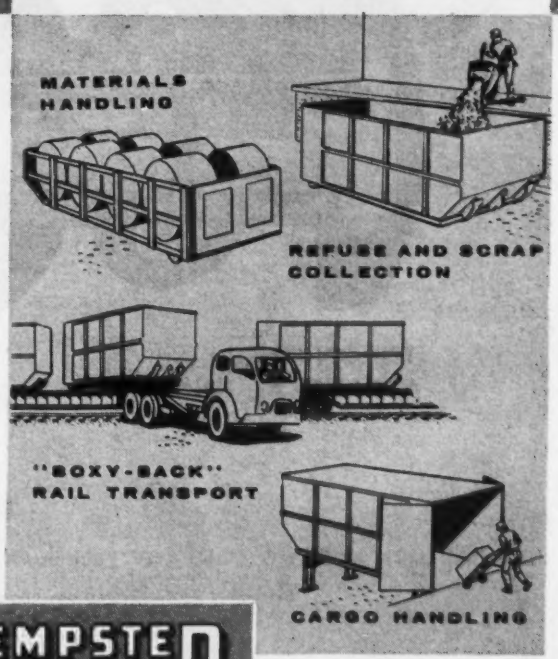
Here's the detachable container system of a hundred uses. The simple, powerful, one-man DEMPSTER-DINOSAUR automatically picks-up . . . hauls . . . dumps . . . puts down . . . or pushes off on dock, loads limited only by the size of the truck or by highway restrictions. All handling operations are performed without the driver leaving the cab . . . no cables to hook on . . . no chains . . . . . . sheaves . . . winches. Models available for single or tandem axle chassis . . . 22,000 to 30,000 pound gross loads. Containers, six to 40 cu. yds. and over, available for refuse, scrap, materials handling, cargo, "boxy-back" rail shipments and many other uses. Write today for brochure or for a demonstration in your city.



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Check 3263 opposite last page.

MORE OF THE GARLOCK 2,000

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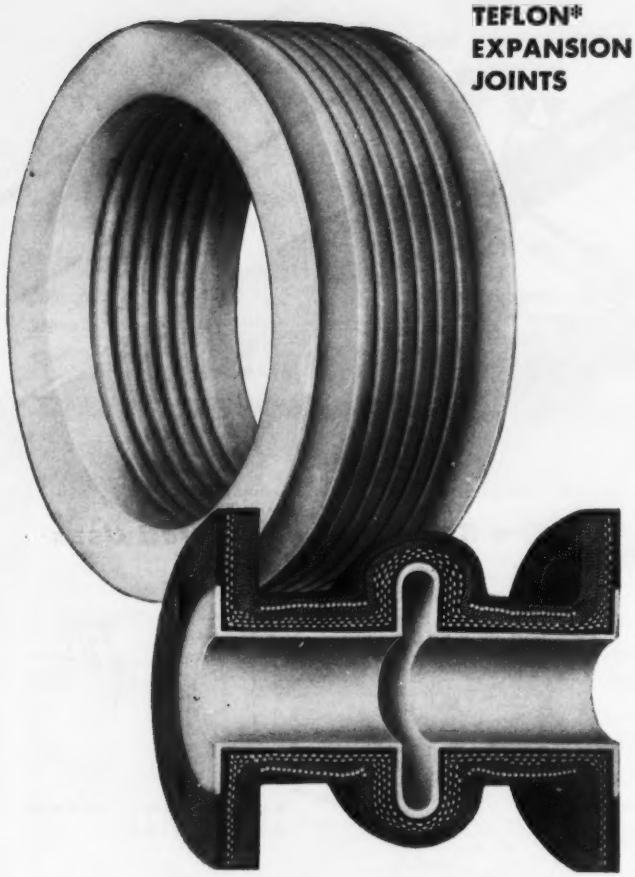

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TEFLON-LINED EXPANSION JOINTS

Generally speaking, solid Teflon expansion joints are recommended for moderate service pressures. Where pressures rise as high as 125 psi., Teflon-lined expansion joints are recommended. Both will withstand temperatures above 175°F.

Garlock offers the most complete line of solid Teflon and Teflon-lined expansion joints. Exposed to the most reactive chemicals, these joints guard costly piping against pressure surges from pumps, compressors, and engines . . . reduce flange breakage, prevent stress, compensate for misalignment.

Discuss your application with your local Garlock representative. He can recommend from "the Garlock 2,000" . . . two thousand different styles of packings, gaskets, and seals. Call him, or write for Catalog AD-137.

*DuPont Trademark for T.F.E. fluorocarbon resin

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Canadian Division: The Garlock Packing Co. of Canada Ltd.

Plastics Division: United States Gasket Company

Check 3264 opposite last page.

has approved acquisition of UBS Chemical Corporation.

Ferro Corporation's Ferro Chemical Division has completed an expansion of its facilities at Bedford, Ohio, for production of vinyl plastic stabilizers and other organic chemicals.

Great American Industries, Inc. has acquired, as a wholly owned subsidiary, the National Chlorophyll and Chemical Company which has plants in Lamar, Colo. National produces chlorophyll, xanthophyll, phytol, carotene, and powdered vegetable extracts.

Foreign Plants

Monsanto Mexicana, S. A., a subsidiary of Monsanto Chemical Company, has completed installation of facilities to produce sodium tripolyphosphate and phosphoric acid at Lecheria, Mexico.

National Starch and Chemical Corporation has purchased Polimeros S. A., producer of vinyl acetate polymers. The company is in Mexico City.

Ethyl-Synthese Company will increase the capacity of its styrene plant at Mazingarbe, France. Work will be handled by the Engineering Division of Societe Belge de L'Azote et des Produits Chimiques du Marly, Liege, Belgium.

Fertilizers & Chemicals Ltd. has placed a nitric acid plant on stream at Haifa, Israel.

Reichhold Chemicals, Inc. has signed a license agreement with Probst & Cia., Ltda. of Medellin, Colombia, for production of synthetic resins using techniques and formulas developed by Reichhold.

Hawaiian Extruders, Inc. has been formed by The Dow Chemical Company and Pacific Chemical and Fertilizer Company, Honolulu, to manufacture polyethylene film and film products in Hawaii.

Chemstrand Limited, wholly owned British operating subsidiary of Chemstrand Corporation, has dedicated its new acrylic fiber plant in Coleraine, Northern Ireland.

Stanley de J. Osborne, President of Olin Mathieson Chemical Corporation

A CHEMICAL BUSINESS PROFILE

Achieving centralization while still maintaining a fairly high degree of independence for various divisions and departments — and concentrating on products with most profit and potential while discontinuing such sidelines as roller skates and electric batteries —

OLIN MATHIESON IS ON THE MOVE

GORDON WEYERMULLER, Associate Editor

Olin Mathieson Chemical Corporation—the fifth largest chemical company in the United States with annual sales of around $700 million — is starting to roll. Program of planned consolidation of its many varied interests and an advanced management concept are starting to pay off in 1959.

The year of 1958 was a period in which the Spartan personality of the company came to the fore. Executives took salary cuts, and drastic economies were made in many departments.

In spite of the recession and other adverse factors, the company still did make a profit, although a modest one, during 1958. While net sales increased in 1958 to $601,398,000 from 1957 sales of $592,877,000, reported net profit amounted to $9,383,000 or 70c a share. This profit, however, was after deduction of nearly $30,000,000 or $2.20 in nonrecurring expenses in connection with corporation's expansion program. In 1959, earnings of 48c per share have been reported for first quarter. Second quarter looks even better.

Management

Brighter future coming on the horizon for Olin Mathieson now can be attributed to the completion of the shakedown period that had to follow the merger of Olin Industries and Mathieson Chemical Company. In August 1954, when the two companies merged to create Olin Mathieson, the new company had so many different branches and lines that it was a superhuman task to keep track of them all.

Under the aggressive policies of Stanley de J. Osborne, who has been president of the company since May 1957, top management's reorganization programs have been completed and operations with little potential for future growth have been pruned. All operations are now consolidated into seven divisions. Company has retained the advantages of

From left to right, John M. Olin, Thomas S. Nichols, John W. Hanes, and Stanley de J. Osborne — who comprise the Financial and Operating Policy Committee of OM

Edward Block (left), Senior Vice President in Charge of the Chemicals Division chats with one of his associates

diversification and autonomy with benefits of a tighter-knit centralized organization.

Having an educational background at Harvard and a major portion of his business experience in finance, Mr. Osborne is the type of man OM needed to improve its profit picture. In making these changes and in planning operations, Mr. Osborne has had the able assistance of such men as Edward Block, Senior Vice President in Charge of the Chemicals Division. Mr. Block joined Olin Mathieson when Blockson Chemical became a part of OM in August 1955.

Chemicals

It was due to the efforts of Mr. Block and his associates that the sales and profits of the Chemicals Division remained about the same in the recession year of 1958 as in 1957. In the same way, these men can take credit for the chemical plant modernization and expansion program that holds much promise for the future.

SunOlin Chemical Company was formed during the past year as a jointly owned affiliate with Sun Oil Company to produce synthetic urea from ammonia manufactured at Sun's Marcus Hook refinery. Plant will go on stream in early 1960.

Opened during 1958 were new plants for sufuric acid in Beaumont, Texas — dense soda ash in Saltville, Virginia — anhydrous ethylene chlorohydrin in Doe Run, Kentucky — and for aluminum fluoride in Joliet, Illinois. Expansions were completed for hydrofluoric acid in Joliet — sodium nitrate in Lake Charles, Louisiana — and calcium hypochlorite products in Niagara Falls. A large-scale modernization program is underway in the caustic-chlorine plant at Niagara Falls. Hydrazine chemicals is another area being developed. Chemical plants are operating full capacity as are pharmaceuticals.

Pharmaceuticals

Closely related to chemicals, the Squibb Division marked the 100th year of its founding by setting a new sales record in 1958. Great emphasis on research on such things as cancer, new products, and increasing demand for other products permit this division to look forward to the future with confidence. Squibb is definitely not for sale.

Energy

Another activity of OM is that under the Energy Division. At times during the past year or two, Olin Mathieson stock has risen sharply on news of the company's increasing participation in high-energy fuels, solid propellants, nuclear fuel elements, and similar products. To those in the company, this does not seem realistic since most of these materials are being made on fixed fee contracts with the Government, which means that profits are limited. The company, which established a boron research unit eight years ago, feels that the future for boron chemicals could be good aside from their military applications.

Aluminum

Aluminum did not contribute to earnings in 1958 and is not expected to do so in 1959. The future for aluminum, however, is good over the long run. The company's total investment in the aluminum industry is approximately $250 million.

Aluminum yields are higher, costs are lower, electricity required less, and quality better than contemplated. Company has a nickel a pound of rapid amortization that is being written off until 1963. Including that 5c a pound, company is still producing pig under the market price today.

One reason for the more promising outlook for OM now is that management has taken the bull by the horns and disposed of assets unrelated to company's principal activities. No longer does the company have a roller skate department. The electric battery division was also considered just a little too far afield for a company whose main business is chemicals.

Most of the investment in a ramjet-engine maker has been liquidated, along with that in an engineering company engaged in aluminum for fabrication. Interest in a construction company was terminated. A retail distributor of household products was liquidated as was an irrigation equipment department. These changes and others released about $10 million capital for the company and eliminated an annual drain on earnings of about $2 million.

Packaging and Winchester-Western are still considered important divisions of the company with good future prospects. International activities form a substantial portion of the OM picture as the company now operates in 66 foreign countries. A number of new plants are being built abroad and present ones are being expanded.

Notwithstanding its activities in missile fuels and other new fields, Olin Mathieson is still principally a producer of basic chemicals. Unlike most of the major chemical companies, OM is not in plastics and is not seriously considering entering this field. After this period of introspection, transition, and organization, Olin Mathieson is now starting to set the pace — is really on the move, which will become more evident in the months ahead.

Section of OM Doe Run plant at Brandenburg, Kentucky. Lime handling and process equipment is shown in foreground, with glycols department in background

A vast empire has been opened up by the world's newest water trade route, says the Republican senator from Indiana. His political ally from Wisconsin believes benefits accruing from it will not come magically. But a chamber of commerce official expects . . .

St. Lawrence Seaway To Create New Jobs, Bring In New Money

PAUL HOFFMAN, News Editor

From Rotterdam to Chicago, from the storied Caribbean to romantic New Orleans, effects of the St. Lawrence Seaway have moved out of the realm of dreams into the hard facts of reality.

In Great Lakes cities, where commerce of the world is flowing directly to such ports as Chicago, Milwaukee, Toledo, Erie, and Duluth, many millions of dollars have been spent or have been earmarked for waterfront improvements. And the end is not yet in sight.

Great Britain looks to the Seaway as a means of expanding trade with the Midwest. Chicago and Rotterdam are linked directly by regular ocean vessels. The Japanese are eyeing the Seaway for expanding service to ports in Eastern Canada. One American flag line already has completed a number of regularly scheduled sailings to Caribbean and South American ports.

New Orleans, nearly 1000 miles from destinations of ocean vessels in Chicago, sees the Seaway as providing many benefits.

Roy T. Sessums, assistant vice president, Freeport Sulphur Company, views effects of the Seaway on the Crescent City thus:

"I think the Seaway will enhance New Orleans' position as a port. I think it is axiomatic that when waterborne commerce is stimulated in one area (Chicago) this stimulation spreads to other areas (New Orleans). The Seaway will not be injurious to New Orleans but . . . New Orleans will profit in the long run because of the increased productivity of the Midwest as time goes by."

This is just one of many opinions assembled by CHEMICAL PROCESSING magazine in a months-long study to determine what the future — the impact — of the Seaway will be. This series began on page 26 in the July issue. Following are other viewpoints written expressly for this magazine by U.S. senators, civic leaders, and port officials:

ARTHUR C. KOCHENDORFER
Executive Manager
Toledo Area Chamber of Commerce

With the St. Lawrence Seaway offering additional overseas shipping routes to manufacturers of the Midwest, lake ports are expected to be enriched with the location of additional manufacturing plants. One example, already 44 percent of the nation's production of chemicals is concentrated within 500 miles of Toledo. Indications are that this percentage will be increased.

The following benefits can be expected to accrue to . . . Great Lakes ports within a few years of Seaway trade: (1) Many miles of undeveloped waterfront will be converted into piers. Warehouses will be constructed and cargo handling equipment will be increased many fold. These property improvements will go on the local tax duplicates and add to the wealth of communities. (2) New jobs will be created. There are many phases of importing and exporting, and new employment opportunities are inevitable. (3) Increased world trade will bring "new money" into lake port communities. (4) Local products will be able to compete to better advantage with products of the world in foreign markets.

Senator ALEXANDER WILEY
(R., Wis.)

The St. Lawrence Seaway will contribute more to the future of this country — particularly the heartland of America — than any such project in our history. New economic life will be transfused into our blood stream of trade and commerce. During the first year alone, a 10 percent increase in traffic is predicted. In the future, ever-greater benefits can be expected to spread to more industries and people.

As a result of the Seaway, there will be increased commerce that will influence investments, production, marketing, consumption, incomes, standards of living, and, indeed, almost every aspect of economic life. Increased water-borne trade will require the improving, expanding, and "dovetailing" of our highway, railway, and water systems.

Benefits of the Seaway, however, will not come automatically nor magically; rather, realistic planning will be required by communities, industries, shipping companies, port development agencies, and other interests to get maximum rewards from the Great Tradeway.

RAY H. WEISBROD
Executive Vice President
Milwaukee Association of Commerce

Many Great Lakes cities are looking ahead, hoping to find and develop that magic formula wherein they might reap their share of the economic advantages of this great project. All Great Lakes cities know that busy and successful ports must be supported by adequate railroad systems, by modern highways, and by quality warehouse facilities. They anticipate from the completed St. Lawrence Seaway the same benefits of commerce which seaports of the world have enjoyed in centuries past.

Direct movement of deep-draft lake and ocean vessels will permit industry to move raw materials in large quantities more effectively, to import raw materials from overseas more cheaply, and to reach export markets on the basis of more favorable freight rates and with single handlings at either end of the steamship movement.

It is fundamentally true that whenever there is any type of economic expansion, this in itself acts as a magnet for drawing still more commerce and industry into its orbit. Success breeds success.

To next page

They Scan Future of Seaway

From preceding page

Senator STEPHEN M. YOUNG
(D., Ohio)

This new transportation service has a tremendous potential for all states of the Midwest and west as far as the Dakotas. Commerce of the world will come to our ports, and farm products of the Dakotas, Ohio, Kentucky, and other states will be shipped more quickly and more economically to Europe and North Africa.

It is my judgment that all of those engaged in chemical, petrochemical, petroleum refining, pharmaceutical, rubber, paint, and varnish industries will feel the impact of the St. Lawrence Seaway within a year or so, and will prosper and expand as a result of the added commerce.

International trading is not a one-way street. Customers throughout the world will become men of good will, and the promise of permanent peace is really brighter by reason of the great St. Lawrence Seaway.

CHARLES C. FICHTNER
Executive Vice President
Buffalo Chamber of Commerce

The Buffalo Chamber of Commerce is confident that the St. Lawrence Seaway will serve as a continuing stimulus to the overall economy of our highly industrialized area. While we do not believe the Seaway will change our world trade patterns overnight, its long-run implications are very promising.

In particular, we believe the Seaway will provide a valuable navigation route for the import of iron ores from the Labrador fields in Canada to Buffalo, one of the nation's largest steel-producing centers.

The chamber has conducted annual trade missions to numerous foreign countries for the purpose of stimulating interest in the Niagara Frontier, and particularly in the purchase of "Buffalo-made" products. We have also urged embassies of foreign countries to establish consular offices in Buffalo as a means of helping to generate increased trade relations.

Senator EUGENE J. McCARTHY
(D.F-L., Minn.)

The St. Lawrence Seaway unlocks the interior of one of the largest land areas in the world.

By the engineering skill of man, the seacoast is brought 1500 miles inland. The Port of Duluth itself opens to ocean commerce an area of 540,000 square miles, which includes all or part of 10 states and extends to the Rocky Mountains.

The future of the Seaway is already great, but its potential development is even greater. Without detracting from the magnificence of the Seaway as presently constituted, it seems to me that the full development is still ahead. Deepening of the Great Lakes channels is still to be achieved so the deeper-draft vessels will be able to reach the Port of Duluth. The products which this region have to offer . . . are the basic items which people around the world, as well as in the United States, need for a higher standard of living. In this sense, the future of the Seaway is a contribution to the future of men everywhere to a better way of life.

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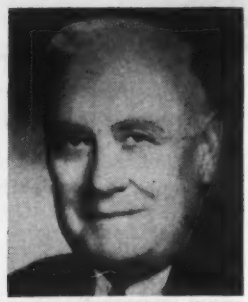
ARTHUR C. KOCHENDORFER


Senator ALEXANDER WILEY

RAY H. WEISBROD

Senator STEPHEN YOUNG

CHARLES C. FICHTNER

Senator EUGENE McCARTHY

Senator HOMER CAPEHART

CARLIS J. STETTIN

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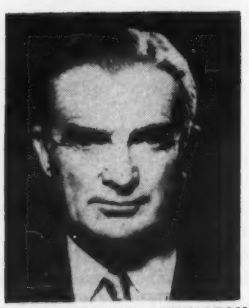
Senator STUART SYMINGTON

Everybody seems to agree that nuclear energy, if used properly, can be a big benefit to mankind. However, what to do with the dangerous residual products that accompany this great new source of energy is still puzzling the experts

RADIOACTIVE WASTE

HOWARD ROGERS
Tracerlab Incorporated, Western Division
Richmond, California

By the year 2000 — or a little later — we may be producing long-lived radioactive waste materials faster than they will decay. Estimates are that by then we will be using approximately one million megawatts of fission power per year. This production rate will result in about 3000 megatons of fission waste yield. The relationship between production of nuclear energy, and its fission product yield, will be seriously over-balanced.

Radioactivity runs a relentless clock; it cannot be hurried or slowed. It cannot be broken down in the same sense as other toxic compounds. On the contrary, biological and chemical reactions in nature may even serve as mechanisms for reconcentrating radioactivity originally released to the environment in harmless forms.

The longest-lived species by far are cesium-137 and strontium-90, with an effective life of about 600 years. Looked at geologically, 500 years is not long. But held against the scale of history it becomes tremendously expanded. Imagine that nuclear-reactor waste containing these two isotopes had been buried the year Joan of Arc was burned at the stake (1431). Today it would still be noxious to any life contacting it.

Tank Costs High

The waste creating the most problems is high-level liquid waste. Many problems will arise with respect to the product gallonage of a doubled and tripled nuclear industry. At the Hanford, Washington, AEC plant, the handling of these wastes involves the storage of millions of gallons in underground tank farms separated at distances of two to six miles. The tanks are concrete, mild-steel lined, and capped. Extensive transfer-pipe shielding is required. Capital cost is stunning — being measured in tens of millions of dollars.

Disadvantages of tanks are obvious, but they must remain almost the sole storage for high-level activities until positively safe methods for ultimate disposal can be agreed upon.

Much had been hoped for ocean sequestration a short time ago, and some concentrated-activities burials are conducted in both the Atlantic and Pacific deeps. Materials are usually packaged in 55-gal drums or precast concrete vaults and dropped down 1000 fathoms off the continental shelf. It is expected that packages weighing at least 19 lb per gal of external volume will sink to the bottom.

But the ocean depths are not as solitary as was once imagined. In fact, the character of currents and the exact effects of pressures at great depths is as yet imperfectly understood by oceanographers and marine biologists. The rate of exchange between surface and deep waters, as measured by Hydrogen-3, now appears more rapid than formerly believed (200 years). At 1000 fathoms, hydrostatic pressures are very high, and seepages are possible.

It is now also known that plankton have a strong affinity for some radioactivities, and their predators would be similarly affected. It has been suggested that if the wastes were deposited on the continental shelf, rather than drifting upward they would be borne downward into the abyss by aquifers. This theory however, is not too firmly substantiated.

Injection Method Offers Hope

Much is hoped for now from disposal in land depths. Wastes might be injected in liquid form into permeable rock, such as sandstone, at depths of 10-15 thousand feet. The waste liquids will need to be of higher specific gravity than the liquids already present in the syncline. Specific gravity of these wastes ranges from 1.1 to 1.3.

There are elements of uncertainty: the effects of thermal heat dissipation will need careful consideration. This heat, coupled with the fact that injecting liquids into permeable strata raises pressures, might induce dangerous fracturing and leakage. Also, since acid aluminum nitrate wastes will almost certainly form gels which will clog the pores of the sandstone, chemically processed dilutions will have to be developed to overcome this tendency.

Solidification Helps

Disposal can be greatly simplified if the waste can be changed into a solid or insoluble character, say in sintered or ceramic form. An alternate choice could be in evaporated solids, possibly separated into elements for convenience, and packaged in metal. A great deal of experimentation is being carried out along the lines of non-leaching agents.

Very recently, a commercial firm has begun operations of a full-scale waste-disposal plant, produced from lab scale developments at Brookhaven. Fission products are reduced by separation and concentration, and then ad-

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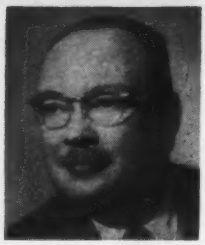
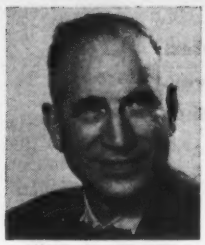
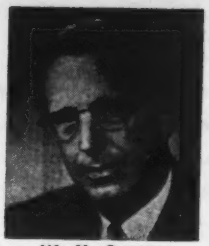
This is a follow-up to last month's story dealing with regulations governing disposal of nuclear wastes. Risks connected with the various disposal techniques in use today are discussed in this story.

W. F. Bixby

R. W. Caldwell


John B. Calkin


Chas. M. Cooper


W. M. Cooper

J. C. Dart

T. C. Dauphine

For nearly a decade, more than a score of men have served anonymously as a "board of directors" to assist CHEMICAL PROCESSING'S editorial staff in shaping its program of news and feature coverage. Here is a behind-the-scenes story on . . .

how CP's working EDITORIAL ADVISORY BOARD *gives editorial inspiration*

Unheralded and unsung—words grown trite with usage but certainly applicable to the men who, past and present, have served as members of CHEMICAL PROCESSING'S Editorial Advisory Board.

For nearly a decade they have been the inspiration for many ideas which have shaped the continuing progress of this magazine.

When the need for an Editorial Advisory Board arose, it was decided that it would be a working board—not a mere listing of names on a masthead without contributions from members. This was to be an operation wherein ideas would be thrown into the hopper, considered, and weighed so that the best ones would find their way into the publication.

Thus, CHEMICAL PROCESSING'S Editorial Advisory Board was created in 1951 so that use might be made of the broad experience from the field to supplement that of the broad educational and industrial experience of the editorial staff.

Why an Editorial Advisory Board? What does it do? Who are its members? What have they contributed toward a better publication?

Men of Varied Interests

EAB members come from many segments of the chemical processing field. Active men, their interests are as varied as the industry is broad. Past and present, members represent research and development, engineering, product development, and processing as well as other phases of CPI which lie within the scope of CHEMICAL PROCESSING'S main areas of interest.

The EAB is a working board. It meets regularly with CP's editorial staff. Such meetings might be held in Washington, New York, Chicago, Cleveland, or any other location. At times, the editorial staff has special meetings with groups of EAB members.

Meetings are not "love feasts." Rather, they can be likened to critiques. New developments—and tips on things to come—are discussed. Problems encountered in the field—CHEMICAL PROCESSING'S editors range the country far and wide—are studied, and solutions are suggested.

Editorial content is evaluated. Praise is given if merited; criticism is meted out if justified. Future plans are reviewed.

From these meetings have evolved some of the outstanding features which have made CHEMICAL PROCESSING the leader in its field. One of the important contributions made by the board has been the "Pioneers of Progress" series. The "Pioneers" were selected by the board to give recognition to chemical companies for outstanding accomplishments.

Many "Pioneers" Suggested

At first, board members were divided in their opinion as to the merit of this project. However, before the meeting adjourned, it was generally agreed that the basic idea was sound, and many companies were suggested as being worthy of recognition.

At subsequent meetings, other recommendations were made. Result: A series of highly informative, novel articles based on the team work theme were published.

Future issues of CHEMICAL PROCESSING will carry more of these "Pioneers of Progress."

The present "Processing and Engineering Data Section," which appears as a regular feature, was proposed at the initial meeting of the board.

Since that time, close to 300 nomographs have been published, many of which have been submitted by readers. Readership of this feature has proved the merit of this basic idea.

Other examples of ideas injected into the publication include the "Corrosion Control" section which has contributed so much to new ideas in fighting the "battle of corrosion."

Management and business type articles, so important in editorial coverage of the field, are other contributions.

It is the belief of the EAB and staff that it is important for the key people in the chemical processing field to keep abreast of management topics as well as technological progress.

How Does Board Operate?

At the time a meeting is called, each member is given a specific assignment as a basis for discussion. A well-

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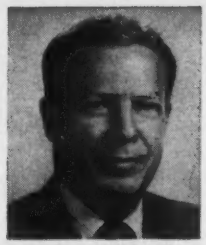
C. P. Davis

J. F. Dudley

W. L. Faith

A. W. Fleer

Lawrence Flett

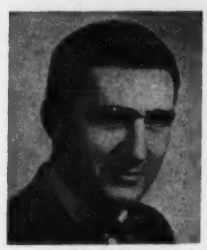

John H. Folwell

Henry W. Grote

Robert E. Hulse

Walter E. Lobo

Robert S. McDaniel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A. P. Moss

Edgar L. Piret

William C. Rousseau

L. E. Russell

Louis M. Sherman

E. R. Smoley

E. F. Wagner

W. H. Williams

C. F. Winans

Harold Wittcoff

J. William Zaber

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B. F. Goodrich Chemical Company

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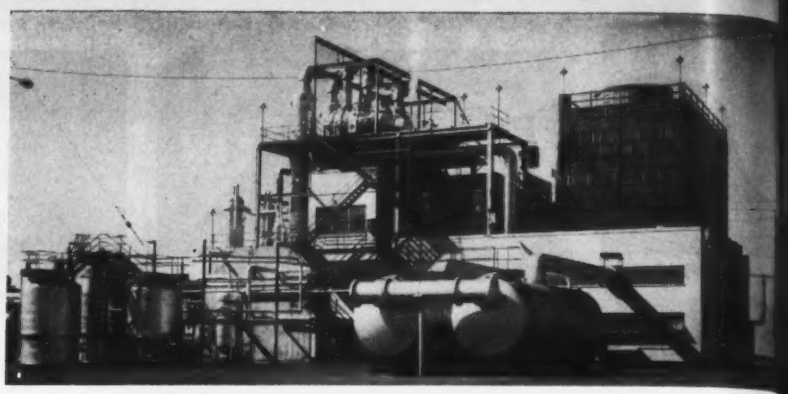
General Mills

J. William Zaber, Director
Research Division
Wyandotte Chemicals Corporation

Capable of supplying 50 gpm of turbidity-free, non-organic, demineralized water for use in hydrogen peroxide manufacture, Solvay-designed system produces . . .



Overall view of hydrogen peroxide plant at Syracuse, New York

ULTRA-PURE WATER FOR LESS THAN ONE MILL PER GAL

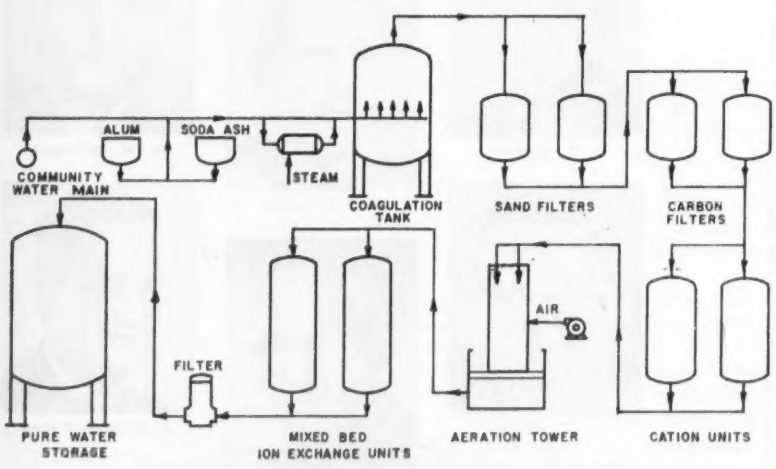
L. S. TRACY, Engineering Department
Allied Chemical Corporation
Solvay Process Division
with **CP Staff**

Problem: An efficient and economical process for producing 50 gpm of consistently ultra-pure water was required by Solvay Process Division, Allied Chemical Corporation. The water was needed to manufacture 35, 50, and 70% hydrogen peroxide at the firm's Syracuse, New York, plant.

Specifications were rigid. The purified water had to be completely free of turbidity, contain no organics, and be fully demineralized. Water used for feed to the system would be standard drinking water from community mains.

Originally obtained from a nearby lake, water contains over 150 ppm total dissolved solids, largely in form of carbonates and bicarbonates with some sulfate and chloride. At times, the water shows as much as 25 ppm turbidity. It also contains considerable organic material.

Solution: The task of designing the system was given to the company's engineering division. In a short time, a process capable of achieving the desired results was developed. The attached flow diagram illustrates the purification system that was installed.



Water purification system in use at hydrogen peroxide plant

Removal of turbidity is achieved by treatment with alum and soda ash. These are added directly into the line by means of a proportioning pump. Soda ash is added in stoichemical amounts. Slight excess of alum is used. Water is tempered to a minimum of 55°F by heating with 15 psi steam in a bypass interchanger, if necessary.

Water next enters a 5000-gal capacity upward-flow, pressure-type flocculation tank. Holding time is about one hour. This precipitates most of turbidity. Flocculated material is then removed by passing the water through two 48″-diam, pressure-type, sand filters. Filters are operated in parallel. Units are backwashed once a day.

Removal of organics is accomplished by passing the filtered water through absorbent charcoal. Two 48″-diam charcoal filters are used operating in parallel. These are also backwashed daily. Charcoal is replaced approximately every six months.

Because of the high purity required, mixed-bed deionization was selected for final purification. However, because of alkaline nature of water it was found economical to first subject water to treatment in a cation exchanger to remove metallic ions, followed by aeration of the acidified water in a tower to remove free carbon dioxide. This permits removal of a substantial portion of anions without use of anion exchange resins, thus reducing costs for regenerant chemicals.

An automatic twin-bed cation exchanger was installed. Unit is 36″ in diam and has throughput of 16,000 gal per cycle. Water goes through one bed while other is being regenerated. Regeneration is conducted automatically on a cycle determined by amount of water passed through system. No attention is required other than filling regenerant tank with 4% sulfuric acid between cycles.

Aeration is performed by passing water down 30″-diam redwood tower, through which air is blown upward. About 90% of free carbon dioxide is removed in this manner.

Final purification is carried out in two 36″ diam, mixed-bed ion exchange units. These contain cation and strongly basic anion exchange resins. One unit is always on stream while other is being regenerated.

A conductivity meter continuously monitors water leaving units, signaling operator when specific resistance drops below one million ohms per cc. Operator then switches flow to other unit

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Two compact, flexible centrifugal compressors —

Furnish Oil-free Refrigeration For Coal Chemicals Plant

GORDON WEYERMULLER
Associate Editor

Two centrifugal compressors with special seals designed to provide oil-free refrigeration and oil-free ammonia are playing an important role in the coal chemicals plant of U. S. Steel at Geneva, Utah, which went on stream in mid 1957. Elimination of oil contamination minimizes maintenance and helps keep yields high in the ammonia synthesis section. Reliability, flexibility, and minimum space requirement are other advantages found for the compressors at the new ammonia plant.

At the U. S. Steel plant, ammonia is made from by-product gas containing about 50% H_2. Ammonia is then converted to nitric acid and ammonium nitrate. Largest use for the ammonium nitrate is in fertilizers although it is increasingly being used as an explosive in mining operations.

In the process, flooded heat exchangers are used. Ammonia evaporates on the outside of tubes to cool the gas on the inside. A low-stage centrifugal compressor pulls a vacuum on the heat exchangers. As ammonia enters this compressor at −23°F, white frozen condensate forms on outside of unit. This compressor has seven stages. Pressure at entrance is 16 psia and at exit it is 71 psia.

Ammonia gas at 400-500°F leaving low-stage compressor enters an interstage cooler. If intercooler were not used, more expensive alloys and much greater horsepower would be required to handle gas in next step.

Ammonia leaves intercooler through insulated pipe and goes to high-stage centrifugal compressor which contains six stages. Gas enters this unit at 69 psia and leaves at 199 psia. Ammonia gas leaving compressor enters shell-and-tube condenser. Liquid ammonia drains to small receiver tank immediately below.

Condensation of ammonia occurs at a temperature of 96°F. Liquid ammonia flows to intercooler where it is stored until needed in heat exchangers handling gas from coke ovens. A small portion is brought back to the low-stage compressor and injected into third, fifth, and seventh stages to increase flow through this unit.

System comprising the two compressors and the intercooler has a cooling capacity of 770 ton — viz. it removes 770 times 12,000 Btu of heat per hour at −23°F. All of the equipment for providing this 770 tons of refrigeration is in an area of 20 x 30'.

Oil-free Feature

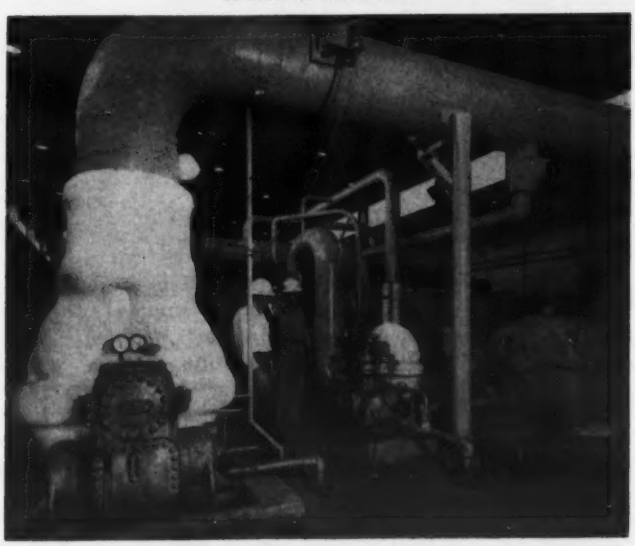
Since oil and ammonia are not miscible to any practical degree, any oil carried over into the heat exchangers would seriously reduce heat transfer. Furthermore, in order to remove the oil, exchangers would have to be taken off of line. This means downtime and loss of production.

Both centrifugal compressors use a special seal, known as the Iso-Carbon Seal, which keeps oil from entering heat exchangers. It provides a complete and dependable barrier between the ammonia being compressed and the bearing lubrication oil.

Seal oil for cooling the floating carbon ring is maintained at a pressure slightly above suction pressure of compressor. Any leakage of oil through carbon ring in direc-

Low-stage compressor (right) pulls vacuum on exchanger partially filled with liquid ammonia, vaporizing it. As ammonia vapor comes through large insulated pipe (top right), and enters compressor at −23°F, white condensate is formed. Hot gas leaving compressor passes through non-insulated line (center) to interstage cooler

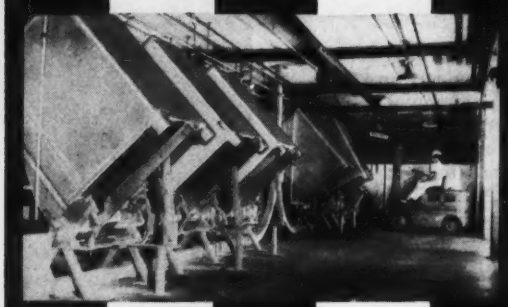
Gas leaves intercooler through looped, insulated pipe (center) and enters high-stage centrifugal compressor (right). Gas leaves compressor through line above frost on compressor at right and passes through large-diameter, horizontal shell-and-tube condenser in background. Liquid ammonia drains to receiver tank below



BULK HANDLING PROBLEMS SOLVED:

the EFFICIENCY of "automation" + the FLEXIBILITY of unit containers =

TOTE* SYSTEM



Compare Tote—a complete, mechanical, automatic bulk handling system based on metal containers plus filling and discharging equipment—with a "push-button" fixed storage bin system. You'll find that Tote offers the advantages you want:

- Compact storage
- Surge capacity between processing and packaging operations
- Accurate and automatic weighing and blending

The labor cost of operating a Tote System is no greater, while the *installation cost of a Tote System is much less.*

IN ADDITION, Tote System retains the flexibility of unit containers:

- *Flexibility in Transportation:* Tote Bins can be shipped by rail or truck, or they can be retained in the plant and filled from bulk hopper cars or trucks.
- *Flexibility in Plant Layout and Procedures:* Tote System can be adapted easily to future requirements. Plant layouts can be changed simply by re-locating discharge stations. Operations can be expanded merely by procuring additional Bins. And the Bins can be used interchangeably for different products.

See Tote at Exposition of Chemical Industries, Coliseum, New York City, Nov. 30-Dec. 4. Booths 858-60.

Why not let our engineers survey your plant at no obligation? Meanwhile, write for new catalog containing complete details.

TOTE SYSTEM, INC.

680 So. 7th, Beatrice, Nebraska

*Tote and Tote System Reg. U.S. Pat. Off.

Check 3265 opposite last page.

NEW SOLUTIONS

tion of gas stream is trapped out and returned to seal oil system. Thus, oil-free refrigeration is assured.

Automatic suction damper with bypass arrangement provides maximum flexibility for varying load conditions.

(Centrifugal compressors, interstage cooler, refrigerant condenser, receiver, and accessories were furnished by Carrier Corporation, Carrier Pkwy., Syracuse 1, N. Y.)

Check 3266 opposite last page.

(Prime contractor for the U.S. steel plant was Chemical Plants Div., Blaw-Knox Company, 300 Sixth Ave., Pittsburgh 22, Pa. Montecatini ammonia synthesis and nitric acid process, along with air-separation and gas-separation units furnished by the German-Linde Company are incorporated in overall system.)

1959 atomic directory of products, equipment, and services has been published. Data-in-depth is provided of more than 220 industrial organizations active in the field. Products, equipment, and services are listed under 40 major classifications and more than 130 subcategories. Copies of 1959 Directory may be obtained by sending $2.50 direct to Atomic Industrial Forum, 3 East 54th Street, New York 22, New York.

"Isn't it time you gave up trying to mix marriage with a career in chemistry?"

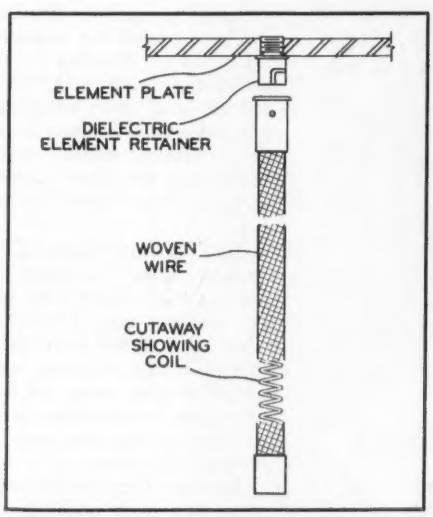
NEW SOLUTIONS
of processing problems

Compact filter is only 10" ID x 30", filters 300 gal batch arsanilic acid in only 7 minutes

Handling a corrosive arsanilic acid solution, efficient filter improves product and streamlines processing. Packing a big wallop in a small space, 10" x 30" unit . . .

CP Staff Photo

• cuts filtration time 87%
• slashes filter aid use 83%



Filter contains 14 1"-diam filter elements. These are constructed of type-316 stainless steel mesh screen fitted around stainless coil

TED F. MEINHOLD, Associate Editor
with **AMBROSE H. PENDERGRAST,** President
Pendergrast Chemical Company

Problem: Filtering a corrosive sodium salt solution of arsanilic acid was a tedious, time consuming, and difficult operation at Pendergrast Chemical Company, Atlanta, Georgia. The conventional filter used for the job had seen its best days and required considerable maintenance to keep going.

It took about 30 lb of filter aid and 30 minutes of labor to filter a 300 gal batch — if no problems were encountered. Channeling, leaks, and cloth blinding were common occurrences, however, and consumed appreciably more time and labor. After each batch the filter had to be throughwashed, dismantled, cleaned, and reassembled. This required at least another 45 minutes. Cloth wear was considerable and the company was continu-

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CODE IMPRINTER
for cans, jars, bottles

Fits in minimum space on any line... no line-cutting or dead plates required

Imprints flat, concave, deeply recessed surfaces

Fully automatic MARKOCODER® machine is a versatile packaging line attachment for imprinting *bottoms* of cans, jars, bottles, canisters, paper containers at speeds up to 600 per minute. Keeps products flowing smoothly. Makes consistently clean imprints from rubber type and fast drying fluid ink. Designed for quick code changes, simple maintenance, easy adjustment for different size cans. Install it yourself in a few hours.

Top-coding attachments also available

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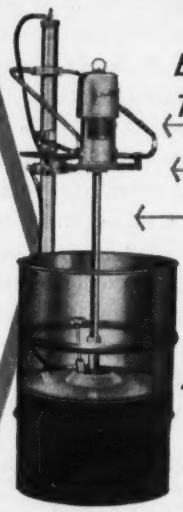
Check 3267 opposite last page.

NEW
Better Way To Transfer
Adhesives
Foods
Sealers
Plastics
Putties

Transfer "STICKY" STUFF "Direct-from-Drum" To Job!



And 100's of other hard to handle materials.

Cleans your drums at the same time!

● This new, air-operated pump and forced induction plate completely seals in the material, prevents contamination, spillage, channeling and waste. Eliminate slow hand operation and messy transfer of difficult material!

You paid for all of it... now get all of it! Graco Inductors move from top to bottom, scrape drum sides entirely clean, get *all* material from drum. Sizes for 55 gal. drum, half drum or 5 gal. pail. Write today for details!

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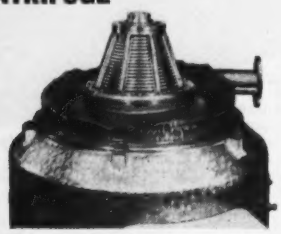
Check 3268 opposite last page.

13
CHOICES
for improved solids deliquefication

4 sizes of CONICAL SCREEN CENTRIFUGE



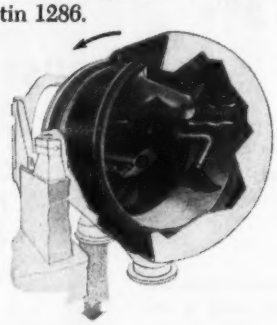
The Sharples Continuous Dehydrator is especially applicable for high concentrations of medium-to-coarse crystalline solids and fibrous pulps.

By changing the size of the openings in the perforate plate and by changing the rotational speed, varying degrees of liquid clarity and/or solids dryness can be achieved as desired. Available in four sizes, with solids handling capacity ranging from a few hundred lbs./hr. to 50 tons or more/hr. —e.g., on synthetic ammonium sulphate the Model 510 will dewater 50 tons/hr. or more to 1% or less residual moisture.

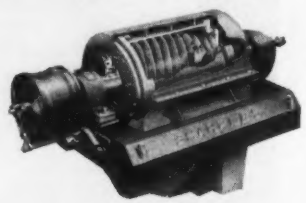
Write for Data Sheet on the Sharples Continuous Dehydrator.

3 sizes of AUTOMATIC PERFORATE BASKET CENTRIFUGE

The Sharples Super-D-Hydrator has an excellent performance record on materials with low drain rates, where product purity is of critical importance. By applying high centrifugal force (to 1250 x g), a unit load of crystals can be handled very rapidly; with the thin crystal layer, there is little filtration resistance, and crystals quickly give up mother liquor. Designed for multiple rinsing for super purity such as is demanded by the polyolefins. Capacities range from a few hundred lbs./hr. to 25 tons/hr., depending on characteristics of slurry. Available for pressure operation. Write for Bulletin 1286.



6 sizes of SOLID BOWL CONTINUOUS CENTRIFUGE



The Sharples Super-D-Canter is a high speed clarifier or classifier, applicable to an extremely wide range of both amorphous and crystalline solids ranging from relatively large size particles down to those a few microns in size.

Solids handling capacity ranges from as little as a few lbs./hr. up to 10-15 tons/hr. and liquid handling capacity ranges from a few gal./hr. to several hundred gal./min.

For example—in the classification of kaolin clay slip a P-7000 Super-D-Canter delivers 16 to 18 tons/hr. of classified product in the liquid discharge (80%-90% 2 microns).

Models are available for operation at pressures to 150 psi. Write for Bulletin 1254.

Whether You are Deliquefying a Super-Pure Hydrocarbon, Dehydrating Ammonium Sulphate, Dewatering Corn Fibre . . . Producing Polyolefins, Removing Suspended Solids to Clarify a Liquid . . . or Any of Hundreds of Similar Operations . . . Sharples has the type and size of modern centrifuge to do the job efficiently at low cost. That's why it will pay you to get in touch with the company that has them all, and can recommend the one best suited to your needs . . .

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Centrifugal and Process Engineers
2300 WESTMORELAND STREET / PHILADELPHIA 40, PENNSYLVANIA
NEW YORK · PITTSBURGH · CLEVELAND · DETROIT · CHICAGO · HOUSTON · SAN FRANCISCO · LOS ANGELES · ST. LOUIS · ATLANTA
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Check 3269 opposite last page.

ously on the lookout for better fabrics.

The filtration operation removes suspended particles and decolorizing carbon from the solution prior to crystallization step. The material has pH of 5 and was filtered at about 50 psi and 100°C. After filtration the acid is set free by treatment with hydrochloric acid, and the product crystallized out.

The company is one of the few in the U.S. — and the only one in the South — manufacturing arsanilic acid. Final product is used in pharmaceuticals and poultry or animal feeds.

Solution: After a thorough study of the situation, company decided to install a diatomite filter. Originally developed to purify water, units of this type can remove minute particles quickly and efficiently.

Measuring only 10″ ID x 30″ high, the compact filter consists of a corrosion-resistant phenolic-lined steel shell containing 14 1″-diam filter elements. These are constructed of type-316 stainless steel mesh screen, fitted around and supported by a stainless steel coil. Filter element design provides "breathing" action and permits unrestricted backwash during wash cycle. Elements are fastened to element plate by dielectric retainers to prevent electrolytic action. Units are easily removed for inspection.

Complete filtering system includes precoat tank, control valves, and other accessories. An automatic precoat control is available which assures precoating the filter elements with uniform layer of filter aid.

Backwashing, flushing, recoating filter elements, and placing filter back into service requires only a few minutes. A flushout swirl nozzle provides fast sluicing action which washes away all spent diatomite from bottom of unit so material can not redeposit on filter elements.

Results: The filtration operation has been sped up considerably. A complete cycle takes only about 10 minutes,

To page 36

THAT'S INTERESTING

Cine-teaching

A new technique in science education has succeeded in its first trial at University of Akron. Instead of performing experiments in the laboratory, students in chemistry classes have watched movies of an instructor carrying them out. Tests have shown students learned subject as well as those who actually did the lab work.

Growing fast

An estimated one million lb per month of cast polyethylene film is being produced and converted into bags or used for overwrap. U. S. Industrial Chemicals Co., which introduced the film to packaging industry in 1958, believes cast film production will hit 3 million lb per month by spring of 1960.

For more information on product at right, specify 3270 see information request blank opposite last page.

BUTYNEDIOL

$HOCH_2C{\equiv}CCH_2OH$

Butynediol, a product of GAF's high-pressure acetylene chemical plant, has multiple centers of activity that open new synthetic routes to previously inaccessible compounds. It reacts as a glycol and a disubstituted acetylene. By trimerization, dimerization, and esterification, it forms cyclic compounds.

If you are interested in the development of agricultural chemicals, pharmaceuticals, electroplating chemicals, textile auxiliaries, or high energy propellents, Butynediol can be of great importance to you.

We have just printed a 44-page bulletin that describes Butynediol's physical properties, storage and handling, chemical properties and uses. You will find it full of the kind of information that stimulates new ideas. Write for it today.

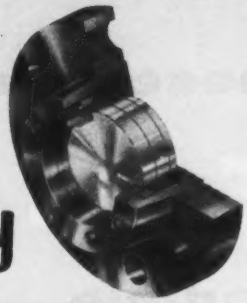
From Research to Reality

ANTARA gaf

ANTARA® CHEMICALS

GENERAL ANILINE & FILM CORPORATION

See with Safety



UNDER PRESSURE

WITH THE

PRES SURE

SIGHT GLASS AND MOUNTING

The rupture of sight glasses cannot be risked in the handling of expensive, inflammable, or dangerous liquids. The PresSure sight glass, with a double safety factor of 10-plus, i.e., a 300 lb. PresSure sight glass will withstand 3000 PSI, opens a greater range of applications for chemical, pharmaceutical, aeronautical, petroleum, food processing, and many other industries. PresSure can be used on new or present equipment; only one mechanical operation required for installation.

Write for descriptive folder giving full information.

PresSure Products Co., Inc.

Dept. 12, P.O. Box 424, Charleston, W. Va.

Check 3271 opposite last page.

MECO

SINCE 1910

. . . the answer to your CONVEYOR AND ELEVATOR problems . . .

Whatever the materials to be handled . . . the need for rugged, reliable, equipment . . . installation space limitations . . . MECO can supply the answer with Conveyors and Elevators, designed, engineered, and manufactured, *to meet your specific requirements!* MECO Conveyors and Elevators embody features and advantages gained in nearly 50 years of experience in the manufacture of material handling equipment—assure efficient, economical operation, and years of trouble-free service—are giving the utmost in satisfaction to numerous users in the chemical, plastics, ceramics, coal, sand and gravel, non-metallic and other industries.

MECO Centrifugal discharge Elevator, feeding conveyor.

MECO Conveyor with hopper and chute for material blending.

For additional information, write today for Bulletins No. 576 & No. 577. Literature mailed promptly. For immediate action, call collect!

THE MANUFACTURERS EQUIPMENT COMPANY

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Check 3272 opposite last page.

NEW SOLUTIONS

Acid Filtration

From page 34

as compared to 75 minutes with previous method. Actual filtration consumes 7 minutes, the other 3 minutes being taken up by the precoating, throughwashing, and backwashing steps. Filtering pressure has been cut from 50 down to 25 psi, considerably reducing the pump workload.

The filter does not have to be opened or dismantled for cleaning. There are no filter cloths to be washed or replaced. Backwash is flushed down sewer. Negligible amount of arsenic that it contains is safely diluted in sewer system.

Cleaner Product

Material savings have also been realized. Only 5 lb of filter aid are now needed per batch, compared to the previous 30. Filtered product is cleaner too. From 10 to 15 lb of contaminants along with 3 lb of activated carbon and the 5 lb of diatomaceous earth are removed from each 300 gal batch.

Except for some minor operational problems encountered during early days of use, filter has performed satisfactorily. Unit has operated for almost two years with essentially no maintenance.

(Diatomite filters are manufactured by Elgin Softener Corporation, 134 North Grove Avenue, Elgin, Illinois.)

Check 3273 opposite last page.

(Further information about Arsanilic acid may be obtained from Pendergrast Chemical Co., 313 Chester Ave., S. E., Atlanta 16, Ga.)

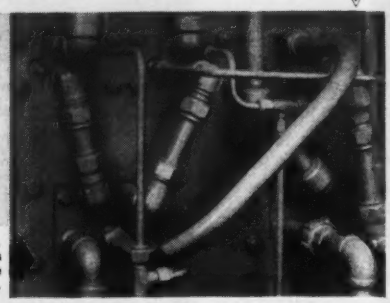
Check 3274 opposite last page.

NEXT MONTH

Tight specs on particle size? In this section next month you can read how American Cyanamid solved their grinding problem on diphenyl guanidine and obtained better working conditions to boot.

IMPERIAL *Engineering and Data Digest*

ENGINEERED TUBE FITTINGS — VALVES — TUBING TOOLS



View of control panel. Note compactness which is impossible with any other fitting.

Why should YOU use Hi-Seal tube fittings?

- cuts space requirements up to 50%
- reduces number of bends required
- cuts manhours and installation time
- substantially reduces the amount of tubing needed
- permits the use of straight lengths of .028" copper tubing in bending temper instead of .032" soft tubing in coils
- eliminates need for straightening
- conforms to J.I.C. and A.S.M.E. standards
- available in steel, stainless steel and brass

Write for Bulletin No. 3061

IMPERIAL

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6300 W. Howard St., Chicago 48, Ill.
In Canada: 18 Hook Ave., Toronto, Ont.

Check 3275 opposite last page.

from blueprint plans
PUGET SOUND FABRICATES
PROCESS VESSELS

nickel-clad caustic storage tank for western chemicals plant

. . . for the Chemical Processing Industry on the West Coast.

You can save on transportation costs, manufacturing time and gain the dependability of over 58 years of custom fabricating experience when you call on Puget Sound as your West Coast source for process and plant equipment in steel plate and alloys up to 1". Send prints for prompt quotation on your next job.

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Check 3276 opposite last page.

Ultra-Pure Water

From page 30

and manually regenerates exhausted unit. About two hours are required for regeneration with 4% caustic and sulfuric acid.

Water leaving mixed-bed unit is passed through cartridge filter to remove any stray resin particles. Filter contains 12 cartridges, each about 3" diam x 10". Pure water is stored in 6000-gal, glass-lined tank.

Results: Water produced in this system is sparkling clear and extremely pure, having specific resistivity ranging from one to 15 million ohms per cc and averaging above eight million. Cost for treating one gallon of water is less than one mill.

(Additional data about Solvay hydrogen peroxide may be obtained from Solvay Process Division, Allied Chemical Corporation, 61 Broadway, New York 6, New York.)

Check 3277 opposite last page.

(Sand and charcoal filters and mixed-bed ion exchange units were manufactured by Illinois Water Treatment Co., 830 Cedar Street, Rockford, Illinois.)

Check 3278 opposite last page.

(Further information about cation exchange equipment used in the system may be obtained from Hungerford-Terry, Inc., Clayton, N. J.)

Check 3279 opposite last page.

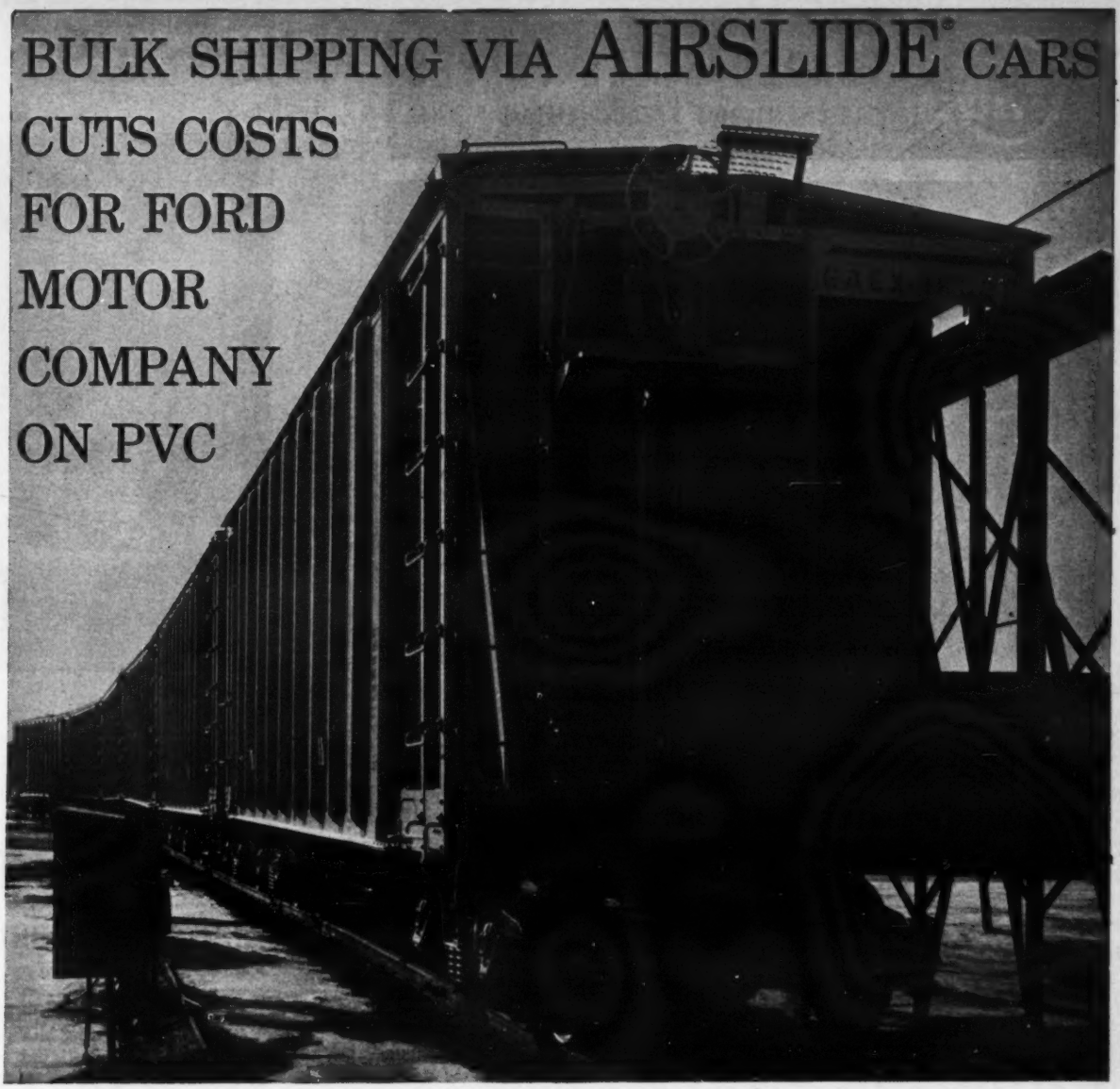
Storage rack design is topic of 24-page illustrated book. Complete step-by-step details are given for constructing various racks from ordinary pipe, without need for drilling, threading, or special tools. "Be Your Own Storage Rack Expert" — Tube-Strut Corp., 2960 Marsh St., Los Angeles 39, Calif.

Check 3280 opposite last page.

Ceramic coating process along with equipment and materials involved are covered in six-page "Flame Ceramics"—Continental Coatings Corporation, 17706 Miles Ave., Cleveland 28, Ohio.

Check 3281 opposite last page.

BULK SHIPPING VIA AIRSLIDE® CARS CUTS COSTS FOR FORD MOTOR COMPANY ON PVC



Producing a better car for the least possible money is a constant challenge to auto manufacturers. To help solve this problem the Ford Motor Company is cutting costs of transporting PVC resin by bulk shipping in Airslide cars.

As a result, Ford not only gets substantial savings, but receives the PVC without in-transit contamination.

The Airslide car is filled by blowing the resin through one of the top hatches of the car. At the unloading point, low pressure air is used to aerate the PVC and cause it to discharge by gravity. The product is then taken under vacuum through a pipe to storage bins.

If you ship or receive dry granular chemicals in bulk, investigate the advantages of shipping via Airslide car. You'll find *it pays to plan with General American.*

Airslide Car Department

GENERAL AMERICAN TRANSPORTATION CORPORATION

135 South LaSalle Street · Chicago 90, Illinois

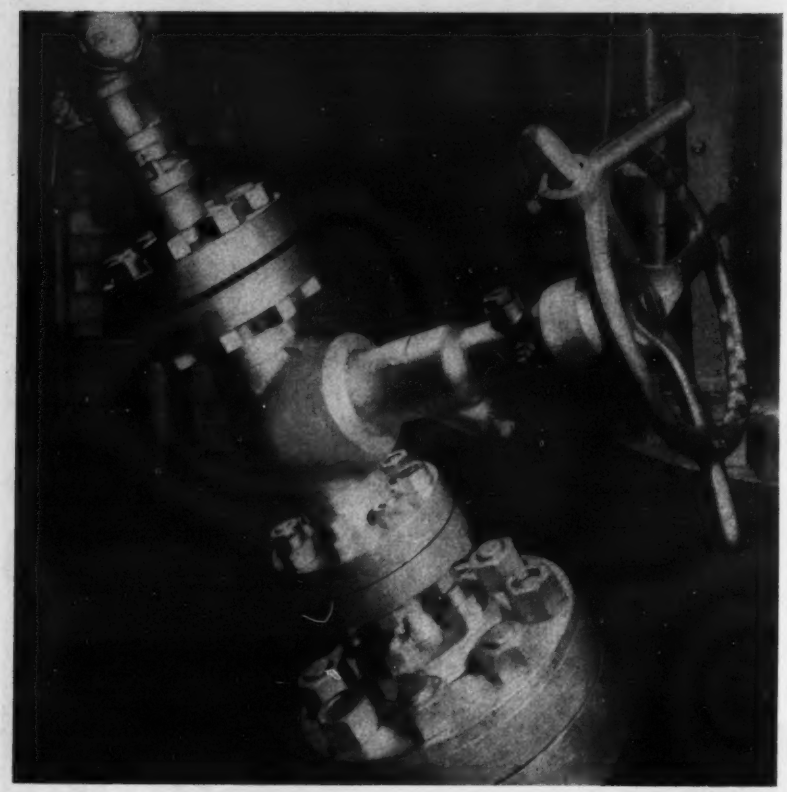
In Canada: Canadian General Transit Co., Ltd., Montreal

AIRSLIDE GENERAL AMERICAN TRADE MARK

Check 3282 opposite last page.

ORBIT VALVES

FORGED STEEL VALVES
FOR CHEMICAL & PETROLEUM PLANTS



ORBIT VALVE shown in above picture is in service on Autoclave Process, Dye Department, Tennessee Eastman Company, Division of Eastman Kodak Company, Kingsport, Tennessee.

PROBLEM: Because this is a batch operation, the Autoclave is charged with the reactant materials and these materials are cooked under pressure. The valves serving the Autoclave must be positive shut-off and contain the reactants during the cooking cycle. Since pressure and temperatures are involved in this process and since the valves are worked for each batch, the service is rugged and requires a good valve. In addition, the catalyst is carried in suspension and is part of a slurry type mix.

SUMMARY: Exacting valve performance is required for service shown and described above. There can be no valve stem leaks. Orbit Valves feature a pliable plastic stem packing utilizing a shredded base of 'Teflon'* as a major ingredient; each tiny shred is like a coil spring. Result: These tiny, coiled springs of shredded Teflon are like a reservoir of energy — exerting reserve pressure in the stem packing chamber. Economic result: A very **minimum of attention** and **no stem leaks.**

*Registered trademark for DuPont's "TFE-Fluorocarbon".

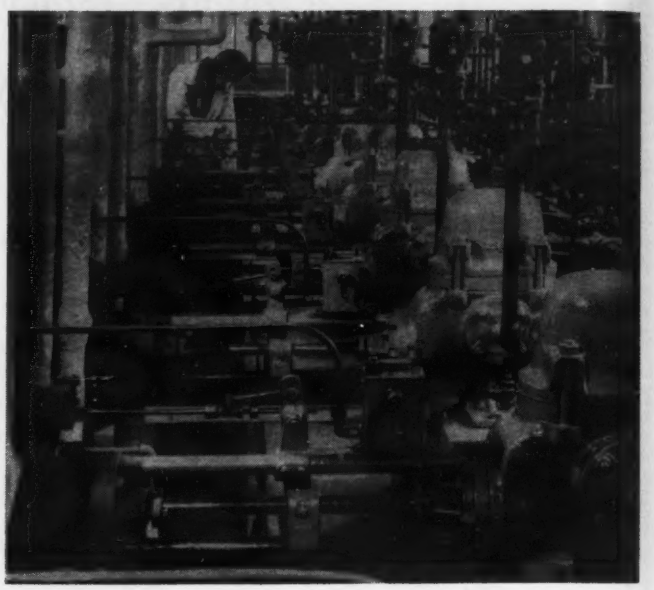
SIZES: 1", 1½", 2½", 3" and 4" ASA 300-lb. through 2500-lb., full opening flanged and screwed ends. Venturi opening available in sizes: 2", 2½", 3", 4" and 6" ASA 150-lb. through 2500-lb. flanged ends only.

SOURCE: Through your favorite industrial supply house.

LITERATURE: Write Department B for Catalog 58-B.

ORBIT VALVE COMPANY
P. O. BOX 699, TULSA, OKLAHOMA
Phone LUther 4-4761, TWX TU 925

Check 3283 opposite last page.



In addition to increasing pump efficiency on chlorinated solvent service at Eastman Kodak —

Braided Teflon packing decreases maintenance shutdowns

Problem: Retaining the piston packing on the liquid end in double-acting steam pumps handling a chlorinated solvent mixture was a difficult problem for the Kodak Park Works plant of Eastman Kodak Company in Rochester, New York.

Until recent years, rubber-impregnated duck packing was the best material available for the purpose. However, the swelling of the rubber in this packing due to the chemical action of the solvent resulted in frequent replacement of the packing as well as loss of efficiency in the pump and considerable downtime. In addition, the rubber packing, as a result of swelling, had a higher coefficient of friction than in a normal application and this led to increased wear of cylinder liners.

Solution: In trying to obtain a more suitable packing that would deliver improved performance, Kodak tried a square lattice braid Teflon packing available in the ¼" to ⅞" sizes required. This packing consists of exceedingly fine fibers of Teflon woven in an interlocking lattice-like cross section pattern to improve strength and durability. Teflon has the necessary resistance to chemical attack and low coefficient of friction that lends itself to this type of application.

A trial set of packing was installed on a solvent pump with a normal shaft speed of 12 twelve-inch strokes per minute against a head of 100 psig. Temperature is a negligible factor in this operation and rarely exceeds that of the room housing the pump.

Results: Performance of the test packing was favorable.

These double acting steam pumps used at the Kodak Park Works plant of Eastman Kodak Co., handle a chlorinated solvent mixture. Piston packing on the liquid end is braided Teflon

This was shown by substantially reduced shutdowns for packing maintenance, with increasing pump efficiency due to reduced slippage. Teflon braided packing operates at a low coefficient of friction against the cylinder liner.

In contrast to previous packing changes at frequent intervals, the braided Teflon has been used in this service for more than three years and is still performing satisfactorily. Kodak has adopted the Teflon braided packing for use on steam pumps in chlorinated solvents service, and also on pumps handling other types of solvents.

(Teflon braided packing is product of The Garlock Packing Company, Palmyra, N. Y.)

Check 3284 opposite last page.

Additives move upward, costs move downward with conveyor system

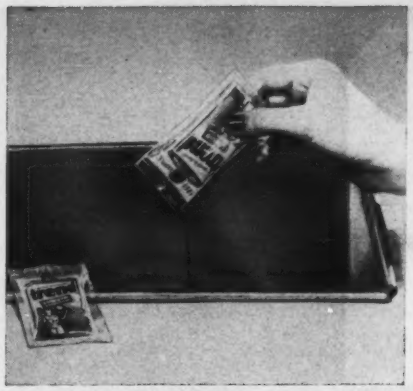
Installation pays for self in six months

Problem: Additions of starches, in batch-mixing processes at Whippany Paper Board Company's Eden Mill in Whippany, N.J., were manual operations, subject to human error and absorbing valuable manhours.

Additives were carried up to platform over top of batch mixers and measured out into batches. These processes required almost constant attention.

Solution: Tubular conveyor system for use as adjustable volumetric feeder was installed at each of three separate batch-mixing locations.

In each conveyor system, additives are introduced to receiving hopper, which is waist-high from main floor



LIQUID DETERGENT is safely packaged in envelopes of "Scotchpak". Tests on polyethylene and other film laminates showed seam leakage. "Scotchpak" holds tight.

STRONG CHEMICALS—in liquid or dry form—can be packaged in "Scotchpak". Film resists puncturing and tearing, can be printed easily—no anchor coat needed.

PASTE CLEANSER shelf life was extended 50% when this manufacturer switched from polyethylene to "Scotchpak" Heat-Sealable Polyester Film.

SAMPLES of almost any inorganic or organic compound can be sealed in envelopes of "Scotchpak". Transparent packages are easy to handle, easy to ship and store.

SCOTCHPAK BRAND
SCOTCHPAK BRAND
SCOTCHPAK BRAND

level. Conveyor moves materials, horizontally and vertically, to discharge hopper over a batch mixer.

Conveyors are standard two-inch tubular units with neoprene-flighted chain. They are adjustable from 1.4- to 10-fpm chain speed, giving variable delivery of from one to seven cfh operating with full chain. Speed is manually controlled through vari-drive unit.

Sealed-pin design reduces chain wear and permits handling of abrasive material. Dust- and odor-proof unit is self-cleaning and self-supporting. Standard unit in this type of conveyor is available in sizes from 2 to 8" with capacity ranges from 0 to 25 cfm.

Results: The services of one worker were redirected by this system. Only labor now needed is that to fill conveyor, thus eliminating requirement for man to carry additives up to platform.

This saving, combined with that from reduced spillage, has paid for conveyor in six months of operation. Predetermined control positions on vari-drive unit give order of accuracy necessary.

(Tubular conveyors are product of Hapman Conveyors, Inc., 630 Gibson Street, Kalamazoo 6, Mich.)

Check 3287 opposite last page.

WANTED: NOMOGRAPHS — WORTH $20 EACH!

Do you have a pet nomograph that could save time for other CHEMICAL PROCESSING readers? If so, send it neatly and accurately drawn, with a double spaced, typewritten description to:

Data Editor

CHEMICAL PROCESSING
111 E. Delaware Place
Chicago 11, Illinois

We will pay $20 for each one accepted and published.

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...or your profits... *mix imagination with Alcoa Aluminas*

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For exciting drama, watch "Alcoa Theatre," alternate Mondays, NBC-TV, and "Alcoa Presents," every Tuesday, ABC-TV

For finer products...let Alcoa add new dimension to your creative thinking!

Check 3286 opposite last page.

PROCESS PIPING POINTERS

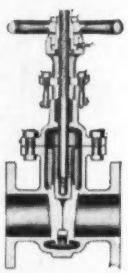
200-pound bronze valves have increased body strength; maintenance is simplified

Cylindrical body shape such as used for steel valves gives these bronze gates increased resistance to external strain, and prevents internal stress concentration. It eliminates pinched effect on body; provides huskier, wider hex ends for firmer wrench grip. Seat rings are Crane Exelloy, rolled in. Easily replaceable bronze disc takes all seating wear. Sizes ¼ to 3 in. Get Circular AD-2285. See below.

"Aids to Selection of Corrosion-Resistant Piping Materials"

You will combat corrosion more effectively with this 12-page technical paper at hand. It discusses questions on important related service factors that are not always evident; shows with colored "Stop, Caution and Go" charts the suitability of metals for more than 150 corrosive fluids, based on extensive tests and experience. Ask for Bulletin AD-1703R. See below.

High-nickel/high-chrome stainless valves ideal for sulphuric acid



On sulphuric acid at elevated temperatures and in a wide range of concentrations, these specially developed "Craneloy 20" valves are giving highly improved service over other stainless alloys. Gate, globe, angle and check patterns are available. Gate valves feature exclusive split-wedge disc with free-to-rotate design that insures tight closure and prevents seizing and galling at seats. Ask for Circular AD-2080; also see Crane ad on next page.

For literature or data on products listed above, please contact J. E. Bradbury, Manager, Chemical Sales Dept. No obligation.

CRANE CO.

Gen'l Offices: 836 S. Michigan Ave., Chicago 5

VALVES • FITTINGS • PIPE

PLUMBING • HEATING • AIR CONDITIONING

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Check 3288 opposite last page.

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processing and engineering **data**

Heat Losses from Horizontal Pipes

IRVING GRANET
Nuclear Energy Department
Foster Wheeler Corporation
New York 19, N.Y.
and
D. S. DAVIS
Head, Department of Pulp and Paper Technology
University of Alabama

Heat losses by natural convection and radiation from bare or insulated horizontal steel pipe to ambient air at or near 80°F can be calculated by means of the accompanying nomograph, which was constructed in accordance with well-known methods[1]. In agreement with data[2] in the literature, the chart is based on the specially developed equation:

$$L = (10^{a+b\Delta t}) \pi (D + 2x) \frac{P\Delta t}{12}$$

where

L = heat loss, Btu/hr
Δt = temp of outer surface of pipe or insulation minus temp of surrounding air, °F
a and b depend upon outer diameters of Schedule 40 pipe
D = outer diameter of bare pipe, inches
x = thickness of insulation, inches
P = length of pipe, ft

Typical Example

Use of nomograph is illustrated as follows: At what rate is heat lost to ambient air at 80°F from 50 ft of 4-inch Schedule 40 steel pipe that has 1½ inches of insulation if the temperature of the outer surface of the insulation is 270°F?

Note that D + 2x = 4.50 + 2(1.50) = 7.50 inches.

Following the key, connect 270° − 80° or 190° on the Δt_1 scale and 4 on the nominal pipe size scale with a straight line and mark the intersection with the L axis.

Follow the slanted guide lines for a first intersection with the β axis and connect this point with 7.50 on the (D+2x) scale, noting the intersection with the α axis.

Connect this point with 50 on the P scale and mark the second intersection with the β axis. Connect this point with 190 on the Δ_2 scale and read the rate of loss of heat as 5×10^4 or 50,000 Btu/hr on the L scale.

For a value of P of 500 ft instead of 50 ft, multiply the value of L by 10 to obtain 5×10^5 or 500,000 Btu/hr.

LITERATURE CITED:

1) DAVIS, D. S., "Nomography and Empirical Equations," Chap 6, 9, 10, Reinhold Publishing Corp., New York, (1955)

2) MARKS, L. S., Editor, "Mechanical Engineers' Handbook," 5th ed, p 377, McGraw-Hill Book Co., Inc., New York, (1951)

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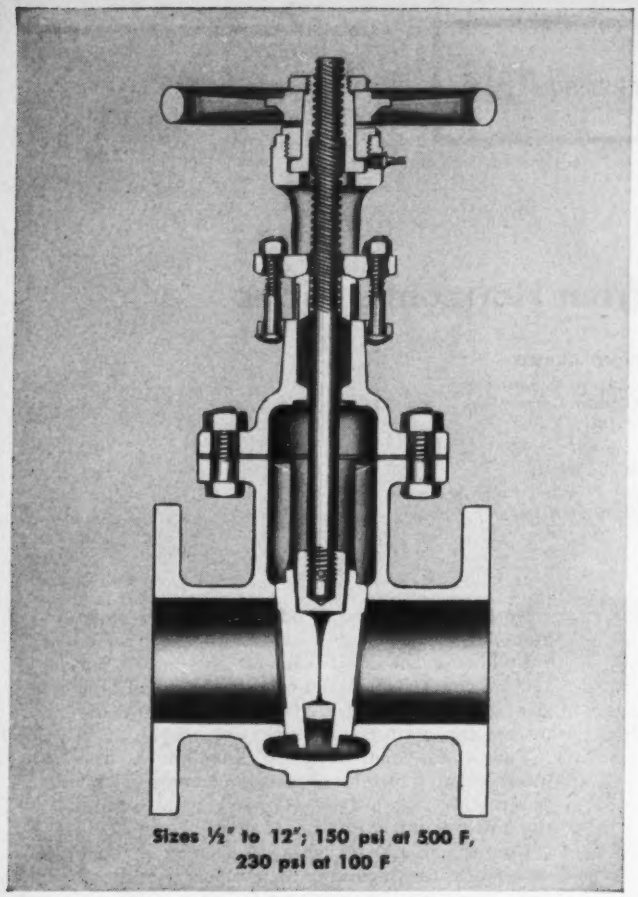
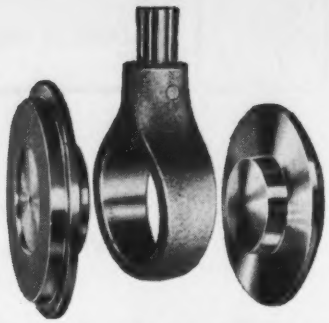
nomograph on page 43

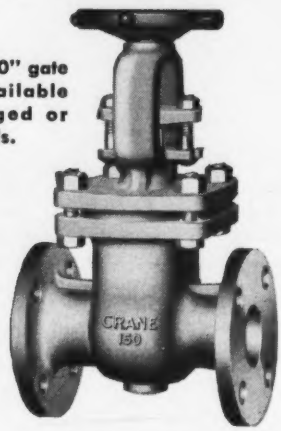


Sizes ½" to 12"; 150 psi at 500 F, 230 psi at 100 F



Crane split-wedge disc design. Identical disc halves assure uniform seating pressure.

"Craneloy 20" gate valve. Available with flanged or screwed ends.



Exclusive design for lasting tight seating in "Craneloy 20" gate valves

The simple, unique split-wedge disc construction in "Craneloy 20" gate valves is the key to smooth operation, tight shutoff and long seat life.

Identical disc halves, exclusive with Crane, mean that seating loads are transmitted equally to each half, assuring uniform pressure on the seating faces. No danger of buckling—there's no weak disc member as in conventional ball and socket disc construction. In opening, the first turn of the handwheel frees discs—even if the valve is closed hot and opened cold.

Special guide flanges on the discs, *another Crane extra*, prevent disc drag across the seat during operation . . . give you longer seat life. Discs are free to rotate to prevent seizing and galling.

All parts of the valve in contact with flow are "Craneloy 20," a high nickel, high chromium stainless steel cast in Crane's own foundries. Stuffing boxes are packed with tough, resilient, non-contaminating Teflon.

For complete information about all Crane stainless steel valves, see your Crane Representative.

Get complete specifications on "Craneloy 20" stainless steel valves. Ask your Crane Representative for Circular AD-2080, or write to address below.

CRANE® VALVES & FITTINGS

PIPE • PLUMBING • HEATING • AIR CONDITIONING

Since 1855—Crane Co., General Offices: Chicago 5, Illinois—Branches and Wholesalers Serving All Areas

Check 3289 opposite last page.

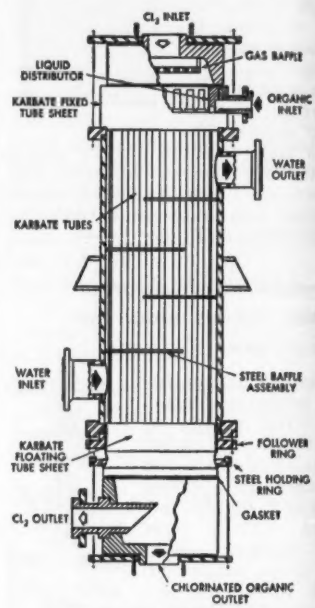
NEW SOLUTIONS

Chlorination simplified with falling-film absorber

Impervious graphite unit removes heat quickly

The simplification of chlorination equipment has long been a goal of chemical process engineers. At the Reichhold Chemical Company, Tacoma, Washington, ingenuity has led to design of chlorinators that provide intimate contact of gas and liquid and remove the heat of reaction almost instantaneously.

Reichhold's engineers asked themselves a basic question — with the falling-film absorber being an effective means of



FALLING-FILM ABSORBER

absorbing HCl in water, why couldn't the same principle be used to absorb chlorine in an organic? Their particular interest was in a reaction process to produce chlorophenol by absorbing chlorine in phenol.

Out of joint development efforts of Reichhold and manufacturer of absorber came a 31-tube Karbate impervious graphite heat exchanger with 16'-long tubes that operates vertically as a falling-film absorber. Falling-film principle, with its good surface contact

To page 44

CONTAINER and LABOR
SAVINGS
packing
barrels
cartons
drums
cans

VIBROX PACKERS

A rugged, mechanical packer, the Vibrox gets more of the material into the same size container . . . or the same amount into a smaller container. Users frequently report savings up to 20% in container costs alone—and additional savings of 15 to 33% in packing time.

The hard-working Vibrox requires no attention on the part of the operator. It operates continuously, packing the material down as the container fills. With a conveyor to carry the containers to and from the packer, the Vibrox makes a tough job easy—and economical.

If you pack a bulk material—in boxes, cans, cartons, kegs, drums or barrels weighing up to 750 pounds—find out what a Vibrox Packer will do for you. For specific recommendations on your packing problems, send a description of the material and data on the type and size of containers. You incur no obligation, of course.

WRITE FOR A COPY OF BULLETIN 401

For details on other Gump processing equipment, refer to your copy of Chemical Engineering Catalog.

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EQUIPMENT FOR THE PROCESS INDUSTRIES

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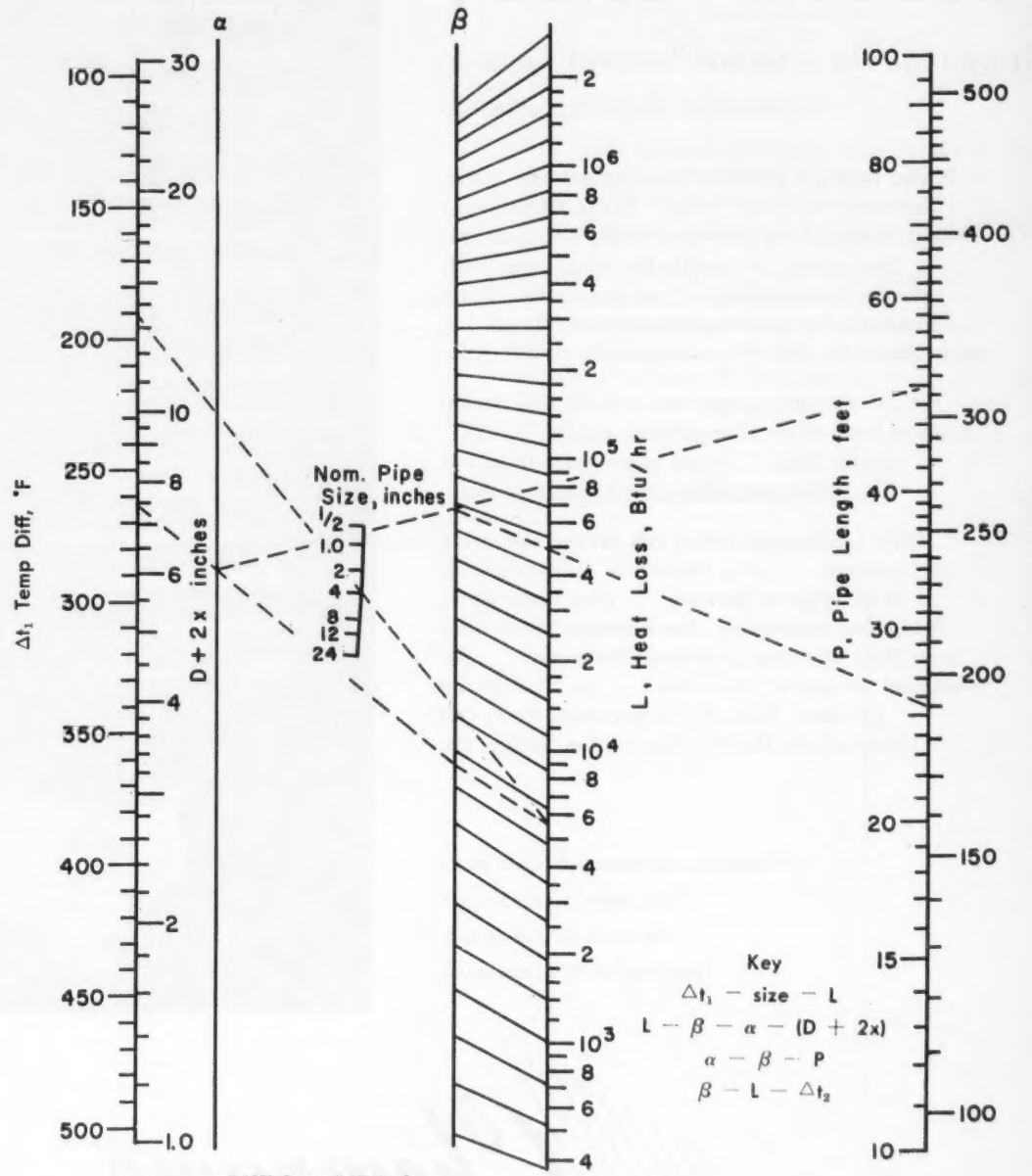
Heat Losses from Horizontal Pipes

From page 41



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WANT TO PUMP ANY OF THESE PROBLEM FLUIDS?

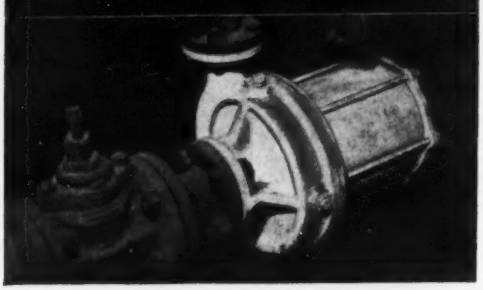
Chempump, the original "canned" pump, handles them all easily.

If you've got a problem handling volatile, toxic, explosive or other "tough" fluids, Chempump is your answer. This process-proved, maintenance-free pump can handle the tough ones with absolutely no leakage or contamination. Units available for system pressures to 5,000 psi . . . temperatures to 1,000 F. . . . capacities to 600 gpm.

Here's a pump that is built to a design evolved from years of experience in the "canned" pump field . . . many more years than any other manufacturer of similar pumps.

Only Chempump offers you proved operating performance . . . from thousands of installations in all types of services . . . plus experienced field sales engineering. Use Chempump to solve your fluid pumping problems. Write now . . . for "request for quote" data sheet . . . to Chempump Division, Fostoria Corporation, Buck and County Line Roads, Huntingdon Valley, Pa.

- Acetic acid
- Chlorine
- Acrylonitrile
- Phenol
- Dowtherm
- Diethanolamine
- Dimethyl sulfate
- Heavy water
- Cyanides (toxic)
- Nitric acid
- Sulphite liquors
- Titanium tetrachloride
- Nitrogen tetroxide
- Hydrazine
- Formaldehyde
- Boron fuels
- Sodium hydroxide (less than 50%)
- Toluene diisocyanate
- Methyl chloride
- Mercaptans
- Ethylene oxide



Chempump combines pump and motor in a single, leakproof unit.
No seals, no stuffing box.
Most models U. L. approved.

Chempump

Finest in the field...process proved

Check 3291 opposite last page.

NEW SOLUTIONS

From page 42

and continuous cooling of the liquid during the reaction process, proved to be ideal for chlorination. Original unit has been operating successfully for more than a year, and a second unit has since been placed in service.

As phenol flows as a film down the inner tube surface, chlorine gas passes concurrently down through the tube and an interaction takes place. Heat is released, and an undue temperature rise would drive the chlorine off and stop temperature-sensitive reaction. Cooling water flowing in the shell over the outside of the tubes, however, removes the heat and allows the reaction to proceed unhindered.

Conventional chlorination is usually accomplished by bubbling chlorine through the organic in a glass-lined vessel that is jacket cooled. If not jacketed, solution is cooled by an auxiliary external recirculation system. Falling-film chlorinator eliminates the recirculating system and results in a simply operated, easily maintained system.

High heat transfer characteristics of impervious graphite provide cooling as efficient as that available from shell-and-tube-type heat exchangers. Technique developed by Reichhold points the way to new applications of this falling-film chlorinating equipment.

(Falling-film absorber is product of National Carbon Co., Div. of Union Carbide Corp., 30 E. 42nd St., New York 17, N.Y.)

Check 3292 opposite last page.

"He waved! He's beginning to know me!"

HIGH PRESSURE GAUGES

USED IN REFINERIES AND CHEMICAL PLANTS THROUGHOUT THE WORLD

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Gauge Cocks
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Check 3293 opposite last page.

Sizing of Cyclone Dip Legs

MRS. PETER D. SHROFF
6963 San Palo Circle, Buena Park, Calif.

This nomograph provides convenient means for determining primary cyclone dip leg diameter in reactors and regenerators of fluid catalytic cracking units. Size of secondary and tertiary cyclone dip legs are normally not critical and are therefore usually fixed.

The chart is based on the equation:

$$\frac{n}{144} \cdot \frac{\pi D^2}{4} = \frac{3600\,Vd}{G}$$

For normal design catalyst mass velocity of 270,000 lb/(hr) (sq ft), the equation rearranges to:

$$D = \left[\frac{7.68\,Vd}{\pi n}\right]^{\frac{1}{2}}$$

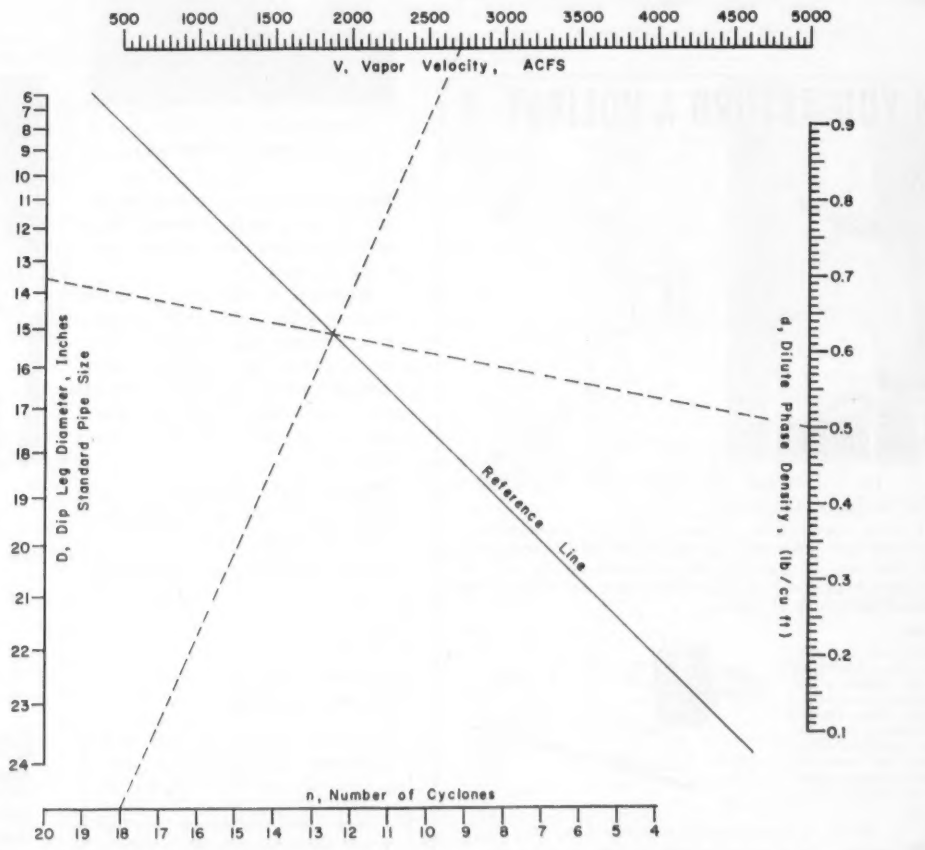
Where:

D = Diameter of dip legs, inches
V = Vapor velocity, acfs
d = Dilute phase density, lb/cu ft
n = Number of primary cyclones
π = Constant, 3.1416

Typical Example

Size the primary dip legs of the cyclones in a regenerator with 18 primary stages, handling 2700 actual cubic feet per second of vapors with a catalyst entrainment density of 0.5 lb/cu ft.

Connect 2700 on the V scale with 18 on the n scale to intersect the reference line. Join 0.5 on the d scale with the reference line intersection point and read on the D scale a dip leg diameter between 13 and 14″; therefore, select 14″ standard pipe for the primary dip legs.



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Push-Button Conveying—

HORIZONTALLY — VERTICALLY OR ON ANY INCLINE . . .

via Screw-Lift

IF you are operating in tight quarters and need a conveying system that will take material from processing machines and deliver to storage, or to packers — "Screw-Lift" is the conveyor for you!

Or, if you want to elevate bulk material from receiving point to storage, later reclaim and convey to processing, and, return again — *you can do it fast, efficiently and without the human element via Screw-Lift.*

Screw-Lifts are doing just that sort of work in hundreds of plants, handling a variety of materials like powders, flour, grain, cereals, sugar, salt, soap, cork, cottonseed, etc. They form an automatic system synchronized with your production flow. They convey horizontally any distance and elevate to heights of 100 feet or more.

Screw-Lifts embody patented features that prevent overloading, degradation or whip. Full accessibility is provided for inspection or cleaning. Made of black iron, hot dip galvanized or of Alloys to suit conditions. Capacity from a trickle to 3,000 cu. ft. per hour.

Write for Bulletin M-500-2. Learn how a Screw-Lift system will simplify your bulk handling and save you money.

Three of the largest feed processing plants in the U.S.A. have over 100 Screw-Lifts in continuous operation
Screw Conveyor Corporation

Check 3294 opposite last page.

NEW SOLUTIONS

Five-gal pail containers cut unloading time by 69 percent

Problem: Unloading five-gallon steel pails at Conco Chemical Company in Dallas, Texas, required aproximately eight hours per car-load. Also, pails occupied extensive storage space.

Company uses pails as containers for products such as degreasers, detergents, disinfectants, soaps, cleaning compounds, waxes, and floor seals. Four or five car-loads of pails are used per year.

Solution: Beginning in November 1958 package units, containing 27 five-gallon steel pails packed in three layers

Containers for five-gallon steel-pails expedite handling

between two corrugated-board caps, were utilized. Two steel straps hold entire assembly firm.

Results: A car-load of pails can now be unloaded in approximately 2½ hours (a 69% reduction). In addition, pails stored in this manner require 1/3 less space. They are easier to handle and more convenient.

(Handy-Pak containers are product of Bennet Industries, Inc., Peotone, Ill.)

Check 3296 opposite last page.

NEXT MONTH

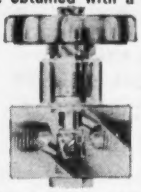
Feature article will tell how solution concentration is automatically controlled at the Petrolia, Pa., plant of L. Sonneborn Sons, resulting in production of microcrystalline wax of uniformly high quality.

EFFORTLESS CONTROL

EASY OPERATION is only one of the reasons why operating engineers everywhere prefer Circle Seal 900 Series precision shutoff valves. A dead-tight seal when closed, minimum flow restriction when open, and a design which provides throttling during valve actuation, are other reasons why the 900 Series has become a favorite. The 303 Stainless Steel body of the valve easily withstands operating pressures up to 6000 psi. Trouble-free valve life is assured by use of "O" Ring seals and a unique floating sleeve that protects the "O" Ring when the valve is open. This is why engineers who know valves are specifying Circle Seal 900 Series Shutoff Valves on blueprints and on requisitions. The Circle Seal T900 Series Valve can be obtained with a quick-acting, toggle-type handle.

PLUG VALVES

CHECK VALVES



SHUTOFF VALVES

CIRCLE SEAL *precision valves*

Complete engineering data available. Write today!

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2181 East Foothill Blvd., Pasadena, Calif.

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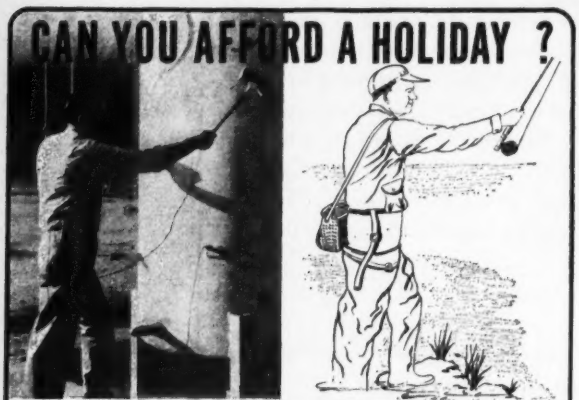
CAN YOU AFFORD A HOLIDAY ?



YES . . . on the money you save with TINKER & RASOR holiday detectors.

The M-1 is an approved inspection device that accurately and quickly locates pin-holes and bare spots. The M-1 is completely portable and may be used by any workmen on the job. The audible signal is powered by dry-cell batteries and makes a simple, positive indication of voids.

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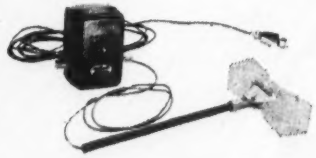

Electric Detectors for every Industry
TINKER & RASOR
417 Agostino Road, P. O. Box 281, San Gabriel, Calif.

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ONE MAN and an...

Horizontal Style 14H

CAR PULLER

MORE QUALITY FEATURES

- Greater safety factor for personnel . . . no rope to snub with wire rope car puller.
- Save time, labor and money . . . one man can quickly and easily spot several fully loaded box cars.
- A type and size to fit your exact requirements.
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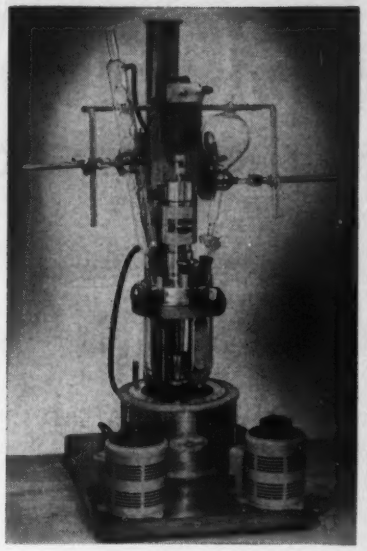
Check 3298 opposite last page.

In making sodium dispersions for a variety of chemical reactions —

Finer particle size, greater stability furnished by white mineral oil

RUSSELL S. TOWERS, Research Technical Editor
Anderson Chemical Company, Weston, Michigan
with **CP Staff**



Laboratory dispersion reactor

Sodium dispersions have made possible, for us, some reactions involving the alkali metal that are otherwise impractical or even impossible. Some of these reactions, usually of the Wurtz-Fittig type of condensation, are carried out in the ur.it in which the sodium was dispersed, and others are made in a separate pot after transferring the sodium dispersion to it through a suitable transfer tube.

This latter operation is benefited by the use of white mineral oil rather than a naphtha or other hydrocarbon with a boiling point higher than 100°C. White mineral oil provides a better degree of dispersion. Reasons for this will be given after details of operation are discussed.

In general, the use of sodium dispersions is accomplished either on a research laboratory scale by using a small dispersion reactor unit (see photo) or on a pilot plant scale using an installation capable of handling up to 5 kg of sodium metal at one time. Some requirements of a dispersion carrier are:

1 — A boiling point minimum of the melting point of sodium, 97.5°C.
2 — Chemical inertness to sodium at this temperature and lower.
3 — Chemical inertness to all subsequent reactions planned for the sodium system.
4 — It must be readily available, in uniform quality, and at reasonable cost.
5 — It should have a flash point above 50°F.
6 — It is usually desirable to have the reactants and possible products soluble in the dispersion carrier at elevated temperatures and relatively insoluble at room, or lower, temperatures.

In actual practice in our research laboratory, the required weight (up to 300 grams) of sodium is placed in the pot of the reactor and enough carrier liquid (meeting the above listed requirements) is added to make a 50% or less active sodium content. At this time, a dispersing aid (0.2% of total weight) in the form of one of the alkali or alkaline earth metal soaps is added.

Contents are heated steadily until a temperature of 110°C is reached, at which time the high-speed dispersing head is started and accelerated to full speed of approximately 18,000 rpm, and continued for seven minutes, or until a distinct purplish color (whichever is first) is achieved. This procedure gives a particle size averaging between 10 and 20 microns with a surface area of 10^5 to 10^6 sq in/lb of sodium.

This dispersion can be used in the pot as made, can be diluted with a more desirable solvent, or transferred to another more suitable reaction pot, all of which is done under a dry nitrogen blanket.

There are several variables in this briefly described procedure, and they are mostly in the solvents and dispersing aids. The solvents, of course, vary in boiling points, solvency, chemical reactivity, and viscosity.

It is in this viscosity characteristic that the white mineral oils seem to have an advantage. If a 50% sodium dispersion is desired and it is possible to dilute the dispersion with a suitable solvent for the following use of the sodium, the use of mineral oil appears to have no disadvantages. Advantage of viscosity of mineral oil appears to give a better degree of dispersion, both of finer particle size and a greater stability against settling.

We explain it to ourselves this way. Because of the comparative lack of mobility of the oil, it appears that more mechanical work can be done by the high-speed shearing head in a given length of time. Supporting evidence for this is the slightly finer and more stable dispersion; and also, the temperature of the mixture during the dispersing process rises slightly higher than with liquids of lower viscosity.

White mineral oils are offered in varying viscosities. Ones suggested in preparing sodium dispersions are Klearol (Saybolt viscosity of 60 sec at 100°F) and Blandol (Saybolt viscosity of 85 sec at 100°F). Higher viscosity oils are also available.

Degree of purity of oils used in preparing sodium dispersions affects the properties of the sodium dispersions prepared therefrom. It can be readily appreciated that since sodium is such a reactive metal, it will react immediately with any impurities that may be present in the oil used to prepare the sodium dispersion, causing discoloration, filtration difficulties, and nonuniformity of products being made.

Also, in preparing alkali dispersions and in their subsequent uses, the dispersions frequently are kept at elevated temperatures for considerable periods. For this reason, an oil is required that will not carbonize or discolor appreciably at elevated temperatures. Accordingly, advantage is taken of the purity and heat stability of highly refined white oils.

(Klearol and Blandol white mineral oils are products of L. Sonneborn Sons, Inc., 300 Fourth Ave., New York 10, New York.)

Check 3299 opposite last page.

(For further information on laboratory dispersion reactor, developed cooperatively by Anderson Chemical Company and Chemtor Products, contact Anderson Chemical Co., Weston, Mich.)

Check 3300 opposite last page.

BORON TRIFLUORIDE

—as a catalyst for your process

BORON TRIFLUORIDE, BF_3

Gas available in cylinders at 1800 psi

Catalyzes alkylations, polymerizations, bodying of oils.

Often only a fraction of 1% is required—simplifies purification of product after reaction.

BORON FLUORIDE MONOETHYLAMINE

$BF_3 \cdot C_2H_5NH_2$ Crystalline solid, m. p. 89°C.

This and other amine complexes of BF_3 find use in elevated temperature curing of epoxy and other types of resins. By dissociating at elevated temperature by the follow reaction:

$$BF_3RNH_2 \rightarrow BF_3 + RNH_2$$

the release of BF_3 can be controlled, allowing control of the cure. These materials are suitable for anhydrous systems.

ZINC FLUOBORATE, 40% SOLUTION, $Zn(BF_4)_2$

used for curing resins on cloth to achieve "wash and wear" finishes. Here, again, the activity is due to release of BF_3 at elevated temperatures.

$$Zn(BF_4)_2 \rightarrow 2BF_3 + ZnF_2$$

Useful for emulsion applications that will be followed by heat curing.

INORGANIC COMPLEXES
- Ammonia
- Orthophosphoric Acid

ALIPHATIC AND ALICYCLIC N COMPLEXES
- Ethylamine
- Piperidine
- Triethylamine
- Tri-n-butylamine

ALIPHATIC N + O COMPLEXES
- Acetamide

ALIPHATIC AND ALICYCLIC OXYGEN COMPLEXES
- Acetic Acid
- Ethanol
- Tetrahydrofuran

AROMATIC N COMPLEXES
- Pyridine
- Aniline

AROMATIC OXY COMPLEXES
- Phenol

HARSHAW

The Harshaw Chemical Co.

Check 3301 opposite last page.

Vinyl-steel bond resists separation

Uses: Bonding of vinyl plastic to steel.

Features: Laboratory tests were conducted with bond formed by adhesive between 10 mil film thickness of plastisol and steel surface. Test consisted of 35% elongation of base metal. Bond was then subjected to following:

1) Boiling water for 30 minutes
2) Dry heat of 200°F for 7 days
3) Tap water @ 70°F for 240 hours
4) Humid storage @ 160°F and 100% RH for 1000 hours

Description: Adhesive is white thin-viscosity solvent-based solution. Consistency is slightly more viscous than that of water. Application may be by spray, brush, float, or roller.

(A-978-B cement is product of B. F. Goodrich Industrial Products Company, Division of The B. F. Goodrich Co., Akron, Ohio.)

Check 3302 opposite last page.

Improved iron chelation attained at acid, low alkaline pHs

Uses: Sequestering iron.

Feature: Improved iron chelation at acid and low alkaline pHs.

Description: Solution of penta-sodium salt of diethylenetriaminepenta-acetic-acid has chelation value of 80 mg calcium carbonate per gram of sequestering agent. Stability constants for 2-valent iron ions are 16.7.

Sequestering of 3-valent iron ions attains peak at pH 5, then decreases slowly, losing iron-sequestering power completely above pH 10. Specific gravity is 1.32; weight, 11 lbs/gal; pH 12 in 1% solution; comp is 57% solids.

(Monaquest CAI-80 iron sequestering agent is product of Mona Industries, Inc., 65 E. 23rd Rd., Paterson 17, N.J.)

Check 3303 opposite last page.

THAT'S INTERESTING

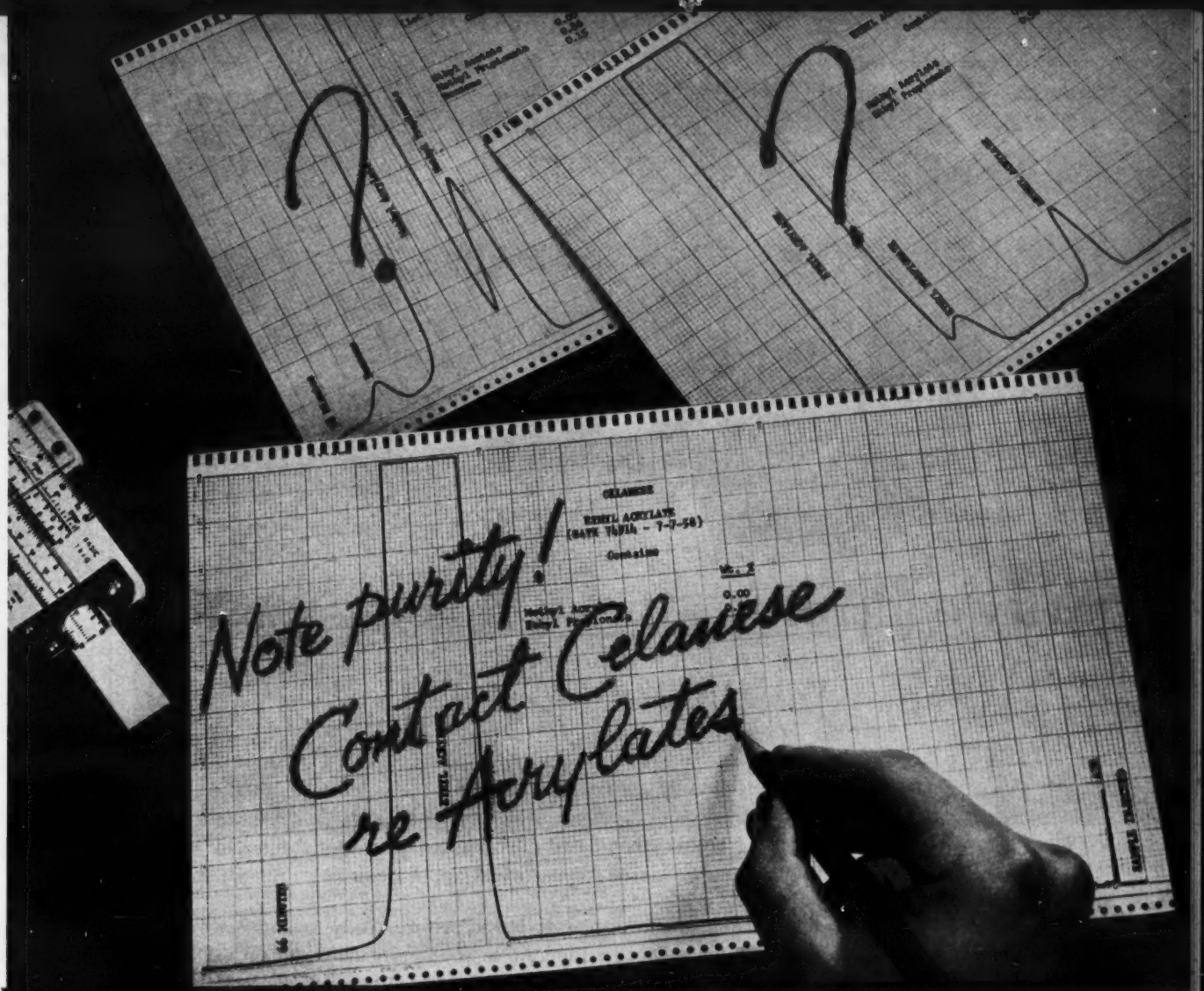
Fill 'er up

Now you can pump up that flat tire with an aerosol container. Astoria Manufacturing Co. recently introduced an emergency air service kit for motorists. Packaged in a 12-oz seamless container, kit provides automatic tire inflation in just seconds. Other predicted uses: inflating rafts, air mattresses, various kinds of sports equipment.

Antibiotic explosion

Beagles, humans have cooperated to aid science in war against disease. Studies of animals and men injected with new antibiotic, Tao, show it causes an "explosion" in bloodstream, attacking disease-causing bacteria on at least six fronts. Tao is product of J. B. Roerig and Co., a division of Chas. Pfizer & Co., Inc.

For more information on product at right, specify 3304 see information request blank opposite last page.



HIGH PURITY OF CELANESE ACRYLIC MONOMERS
GIVES YOU FASTER PROCESSING . . . BETTER PRODUCTS

You may have seen acrylate monomer analyses that look like this: or like this:
You can be sure of one thing — these are *not* Celanese monomers.
The curve for Celanese acrylates demonstrates an even base line uninterrupted by peaks indicating impurities.
As a matter of fact, production-run Celanese acrylate esters are so pure, that they are used as mass spectrographic standards! Because of their high purity these monomers have reduced induction periods, react rapidly, undergo polymerization at a uniform rate, afford a high conversion of monomer to polymer. Products are made better . . . made easier.
Celanese offers methyl, ethyl and butyl acrylates . . . as well as vinyl acetate.
All are available in commercial quantities.
We'll be glad to send you more information on Celanese acrylate esters and other monomers. Simply write to: Celanese Corporation of America, Chemical Division, 180 Madison Avenue, New York 16.

Celanese® BPL1M

Celanese CHEMICALS

In Canada: Canadian Chemical Company Limited, Montreal, Quebec.
Export Sales: Amcel Co., Inc., and Pan Amcel Co., Inc., 180 Madison Ave., N. Y. 16.

Clarity control is almost this easy with DICALITE Filteraids

FIRST REASON is, of course, that Dicalite supplies the greatest variety of filteraids to handle practically every type of fluid . . . a complete family of top-quality diatomite filteraids of different performance characteristics, plus Nerofil carbon-based filteraids and other special filteraids developed and processed for particular applications.

SECOND REASON is that Dicalite makes expert technical service freely available to help you match a Dicalite Filteraid to your particular problem, so that you'll get maximum production joined with greatest economy.

THIRD REASON is the ability of Dicalite Filteraids to handle the all-too-common variations in the filterability of process liquors – usually by the simple method of varying the filteraid dosage to meet the requirements of the 'tough' run. This is one of the criteria of a quality filteraid . . . and Dicalite Filteraids, all of them, are recognized as being without a superior.

Dependable GLC GREAT LAKES Dicalite® FILTERAIDS

. . . give you critical control of clarity

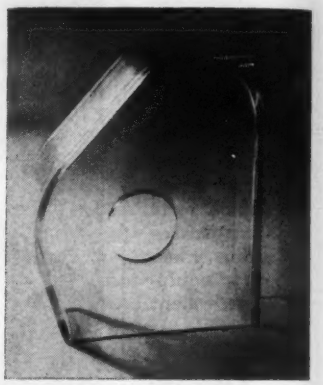
DICALITE DEPARTMENT, GREAT LAKES CARBON CORPORATION • 612 S. FLOWER ST., LOS ANGELES 17, CALIF.

Check 3305 opposite last page.

Light put on subject with resin castings

Uses: In formation of laminating resins or adhesives. May be utilized in construction of models, machine housings, panels, and structural parts.

Features: Resin castings provide 90% light transmission. Shrinkage is 0.0025 in/in. No vacuum procedures are necessary in producing castings.



Light transmission of 90%, which is provided by epoxy resins, is shown here by cast machine housing made from material

Description: Epoxy resin is supplied as low-viscosity liquid which does not need melting prior to blending with liquid hardener. Physical properties are as follows:

Specific gravity, cps	1.16
Compressive strength, psi	15,900
Rockwell hardness	M95
Flexural strength, psi	20,600

(Maraglas resin 655 is product of Marblette Corp., 37-31 30th St., Long Island City 1, N. Y.)

Check 3306 opposite last page.

Microorganisms doomed by chlorine dioxide

Uses: In pink-slime control. Product is used to prevent slime collection on machinery, stock lines, and resulting slime spots on paper products.

Features: Germicide effectively penetrates all categories of microorganisms, bacteria, algae, and actinomy-

cetes, which are commonly found in manufacturing processes.

Description: Aqueous solution of chlorine dioxide is completely soluble in water. It is able to pass through walls of all microorganisms. High oxidizing power interferes with the basal metabolism of a cell. This results in inability of cell to reproduce.

Agent is manufactured by passing chloride dioxide gas into aqueous solution of a peroxygen compound. Displacement of H_2O_2 from peroxygen forms labile complex, stabilized chlorine dioxide.

(Dioxcide is product of Chemical Research Laboratories of America, Inc., Lafayette, R.I.)

Check 3307 opposite last page.

Acrylic-type thermoplastic for service to 240°F

Uses: Engineering material for housings, gears, and similar items.

Features: Plastic has heat-distortion point of 240°F.

Description: Acrylic-type thermoplastic polymer has flexural modulus of 415,000 psi. Its notched izod impact strength is one ft-lb/in. Injection molding and extrusion of natural straw-colored resin may be carried out by conventional acrylic techniques.

(PL-12 plastic is product of J. T. Baker Chemical Co., Phillipsburg, N. J.)

Check 3308 opposite last page.

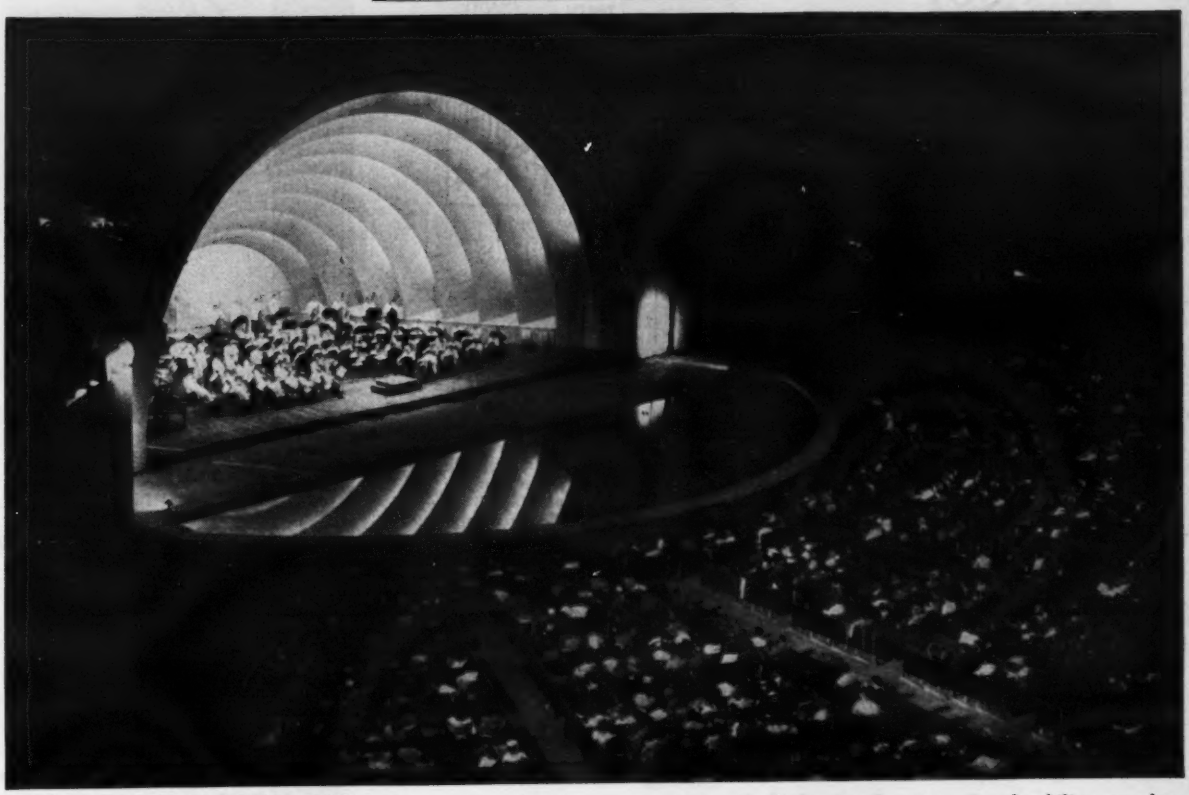
Caustic soda booklet of 84 pages incorporates data in form of tables and graphs on properties, handling, unloading and dissolving. Bul 6—Solvay Process Division, Allied Chemical Corporation, 61 Broadway, New York 6, New York.

Check 3309 opposite last page.

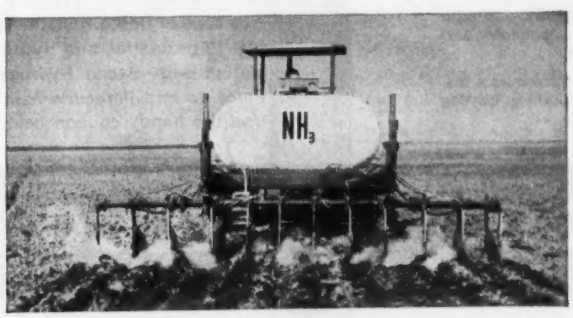
Plastisols and organosols are discussed, defined, and compounding and applications explained in six-page data sheet 101—The Stanley Chemical Company, subsidiary of The Stanley Works, 401 Berlin St., East Berlin, Conn.

Check 3310 opposite last page.

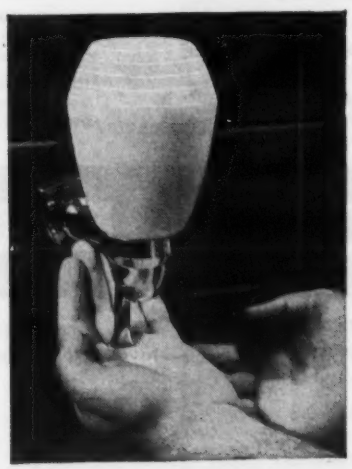
HOW *HERCULES* HELPS...



BEAUTIFY THE HOLLYWOOD BOWL—This crescent-shaped pool, reflecting the concrete-arch acoustical shell, doubles in brass as an orchestra pit, or is covered to add to the stage itself. Its surface is protected against such severe three-way usage by Nelsonite Pool Coating, based on Parlon® chlorinated rubber. Well over half of all the nation's swimming pools are likewise protected with Parlon-based paints, for durability, weatherability, chemical and alkali resistance, and a smooth waterproof finish. Other Parlon-based coatings protect everything from waterworks to chemical plants, gondola cars to tugs and ships; and preserve the good looks of concrete and stucco homes and buildings. Consult your regular source of coatings.



FEED HUNGRY SOIL—Anhydrous ammonia, produced by Hercules plants in three important agricultural areas, replenishes nitrogen-deficient soils. Literally "injected" into the ground, the ammonic nitrogen combines almost instantly with soil particles. Applications can be made nearly any time of the year when temperature and moisture conditions are suitable.



SERVE SOAP IN STYLE—Bobrick's new line of soap dispensers features an unbreakable plastic globe made with Hi-fax® high-density polyethylene. Hi-fax is now being used in blown containers of many types, offering handsome styling durability and resistance to chemical corrosion in a low-cost, easily-processed plastic material.

HERCULES POWDER COMPANY
INCORPORATED
900 Market Street, Wilmington 99, Delaware

CHEMICAL MATERIALS FOR INDUSTRY

HERCULES

Check 3311 opposite last page.

Which of these 3 products and services can you use from Becco?

TECHNICAL BULLETINS DESCRIBING H_2O_2

We got 'em—
You can have 'em—
They're FREE!

Years of experience in working with Hydrogen Peroxide have produced a wealth of information on this valuable compound, its properties, and reactions. Much of this information is available virtually exclusively from Becco. We've compiled a number of Technical Bulletins, which are yours free on request. Simply decide which ones you want, and mail the coupon below.

No. 2—Hydrogen Peroxide (general information)

No. 41—Becco H_2O_2 35% HP (high purity)

No. 42—Becco H_2O_2 35% Formula D (for preparing dilute solutions)

No. 46—Concentrated H_2O_2 (over 50% concentration)

No. 70—Becco Hydrogen Peroxide SP "100" (Super Pure, of virtually 100% concentration.)

Where can you use these *other* Becco PEROXIDES?

By "other", we mean "Other than Hydrogen Peroxide". Lots of otherwise knowing people labor under the impression that Becco makes only H_2O_2. Actually, there are quite a few "other" useful peroxides in Becco's catalog, some of which are especially suited to high-temperature oxidation reactions.

Look over the list below. Give you ideas? Remind you of a problem you've got? Either way, a note to Becco will bring you more information. Or, use the handy coupon.

UREA PEROXIDE—for use in hair dyeing and cold waving, disinfectants, hypo eliminators, and as a source of water-free H_2O_2.

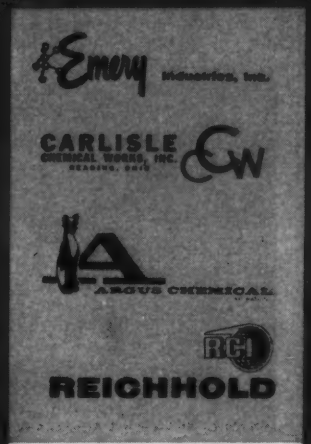
SODIUM CARBONATE PEROXIDE—for compounding detergents and adhesives.

SODIUM PERBORATE—for use in dyestuff development, detergents, tooth-powders; as a mild bleaching agent and cold wave neutralizer.

CALCIUM PEROXIDE—for dough conditioning and in high-temperature oxidation reactions.

MAGNESIUM PEROXIDE—an antifermentative, for compounding antacids and laxatives.

ZINC PEROXIDE—for use as a disinfectant and deodorant in dusting powders, ointments, etc.



Over 100,000,000 pounds of plasticizers have been made with Becco proved-in-production epoxidation processes, using Becco H_2O_2!

Practically everyone who manufactures plasticizers is using a Becco epoxidation technique or a slightly modified version.

Since 1950 Becco has been foremost in research and development of the epoxidation of unsaturated fatty acid esters.

Take advantage of these years of experience. Write immediately, outlining your particular interest, or request a free copy of Becco Bulletin No. 69—"Epoxidation and Hydroxylation with Becco Hydrogen Peroxide and Peracetic Acid". Use the handy coupon below.

BECCO fmc

BECCO CHEMICAL DIVISION, FMC
Station B, Buffalo 7, New York
Dept. CP-M

Gentlemen:
Please send me the free Technical Bulletins checked below:

☐ #2 ☐ #41 ☐ #42 ☐ #46 ☐ #70

NAME_____

FIRM_____

ADDRESS_____

CITY_____

ZONE_____ STATE_____

BECCO fmc

BECCO CHEMICAL DIVISION, FMC
Station B, Buffalo 7, New York
Dept. CP-K

Gentlemen:
Please send me
☐ Becco Bulletin No. 1—"Active Oxygen Chemicals".
☐ Detailed information on _____

NAME_____

FIRM_____

ADDRESS_____

CITY_____

ZONE_____ STATE_____

BECCO fmc

BECCO CHEMICAL DIVISION, FMC
Station B, Buffalo 7, New York
Dept. CP-N

Gentlemen:
Please send me a free copy of Becco Bulletin No. 69.

NAME_____

FIRM_____

ADDRESS_____

CITY_____

ZONE_____ STATE_____

WHAT DO YOU THINK?

Opinions and comments on the significant subjects carried in each month's CHEMICAL PROCESSING are important! We *welcome* your letters expressing your views. Many CP readers are taking the opportunity to state their views on today's top questions. By publishing your letters in CHEMICAL PROCESSING, others will have the opportunity to hear your side.

Perhaps you agree

with what has been written in these articles.

Maybe you don't.

You might even have a thought or angle which wasn't expressed.
If so, why not let us and others hear your ideas? Suitable letters will be published in our regular "Letters from Readers" column. (See page 10.)
Address your comments to:
The Editor
CHEMICAL PROCESSING
111 E. Delaware Place, Chicago 11, Illinois.

For more information on product at left, specify 3312 see information request blank opposite last page.

Vinyls are stabilized no sulfur-staining

Uses: Calendering, extruding, and molding of plasticized unfilled vinyl formulations.

Features: Stabilizer is nonplating. It has low level of sulfur-staining.

Description: Stabilizers are liquid barium-cadmium-zinc compounds. They contain no fatty acids. Compounds require ¼ phr of stearic acid for maximum stabilization at any concentration level.

(Ferro 1234 and 1237 are products of Ferro Chemical, Division of Ferro Corporation, Bedford, Ohio.)

Check 3313 opposite last page.

Synthetic rubber extended with 50 parts of oil

Uses: One synthetic rubber (1713) has application in molded or extruded goods wherein color characteristics are important. Second type (1714C) may be utilized in tires, camelback, and mechanical goods if color and staining would not be critical.

Features: Rubbers are extended with 50 parts oil. They can be processed on standard equipment.

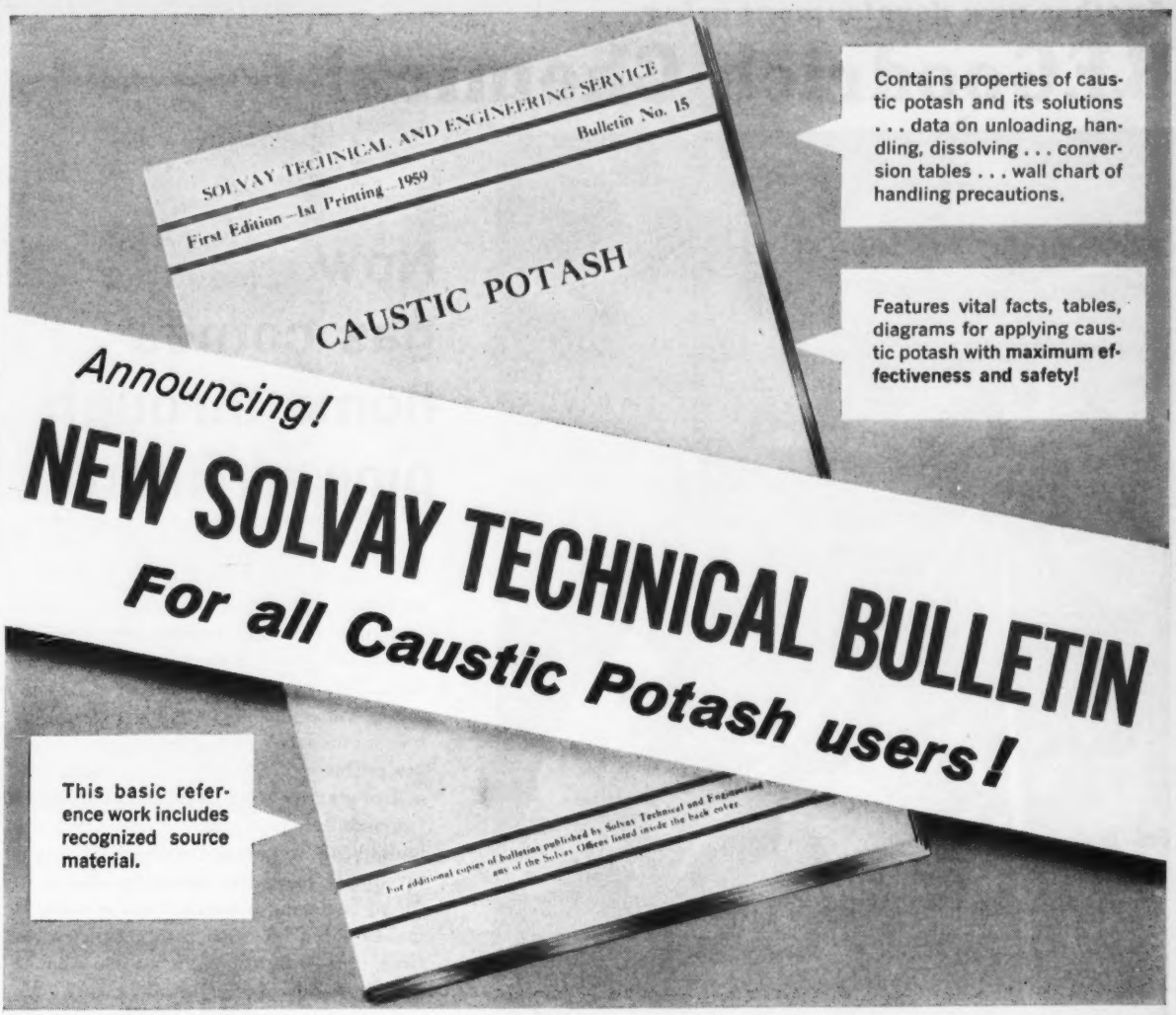
Description: One polymer (1713) is non-staining, nondiscoloring cold rubber extended with 50 parts of naphthenic type oil. Second recently developed type (1714C) is cold rubber extended with 50 parts of highly aromatic oil. It is staining-type rubber.

(Plioflex 1713 and 1714C are products of Chemical Division, The Goodyear Tire & Rubber Company, Akron 16, Ohio.)

Check 3314 opposite last page.

Borohydrides in cellulose and sugar chemistry are subject of 16-page annotated bibliography, providing background synopsis of eighteen publications on borohydride reductions in cellulose chemistry and fifteen in sugar chemistry. Borohydrides Bibliography—Metal Hydrides Incorporated, Beverly, Mass.

Check 3315 opposite last page.


SOLVAY TECHNICAL AND ENGINEERING SERVICE
First Edition—1st Printing—1959
Bulletin No. 15
CAUSTIC POTASH
Contains properties of caustic potash and its solutions . . . data on unloading, handling, dissolving . . . conversion tables . . . wall chart of handling precautions.
Features vital facts, tables, diagrams for applying caustic potash with maximum effectiveness and safety!
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NEW SOLVAY TECHNICAL BULLETIN
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Now America's foremost producer of alkalies— Solvay—brings you an authoritative, helpful sourcebook of the latest information on caustic potash. And it's a *completely new* addition to your Solvay reference library . . . in the great tradition of Solvay Technical and Engineering Service Bulletins.

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Please send me without cost your new Bulletin 15, Caustic Potash, as well as the other Solvay bulletins checked below.

- ☐ #4—Calcium Chloride in Refrigeration
- ☐ #5—Soda Ash
- ☐ #6—Caustic Soda
- ☐ #7—Liquid Chlorine
- ☐ #8—Alkalies and Chlorine in the Treatment of Municipal and Industrial Water
- ☐ #9—The Analysis of Alkalies
- ☐ #11—Water Analysis
- ☐ #12—The Analysis of Liquid Chlorine and Bleach
- ☐ #14—Chlorine Bleach Solutions
- ☐ #16—Calcium Chloride

Name_____
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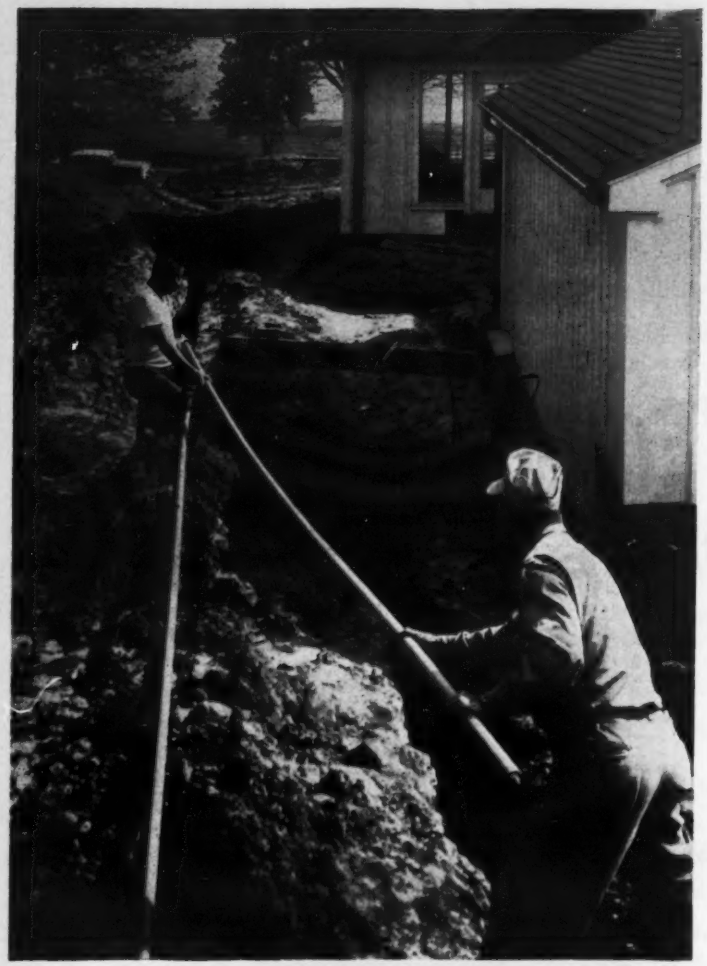
Address_____
City_____ Zone_____ State_____

Check 3316 opposite last page.

Another new development using

B.F.Goodrich Chemical *raw materials*



Now gas comes home through pipe of Geon

The pipe in this natural gas distribution system is made of Geon rigid vinyl. Years from now it will be feeding gas to homes just as efficiently as the day after installation. This pipe stays smooth inside and out because it is not affected by the corrosive influences that affect ordinary pipe. No problems from salt water, chemicals, acid or alkaline soils, or galvanic corrosion.

Conduit or pipe made of Geon provides high tensile and impact strength. It stands up under pressure, resisting effects of fungi, bacteria, moisture, heat or cold. It makes a big hit with installation crews, since it is so light weight and so easy to install.

Engineers are taking advantage of the properties of versatile Geon polyvinyl material for this and many other types of applications. For information, write Dept. AL-6, B. F. Goodrich Chemical Company, 3135 Euclid Ave., Cleveland 15, Ohio. Cable address: Goodchemco. In Canada: Kitchener, Ontario.

1¼" diameter pipe of Geon rigid vinyl is being installed by Illinois Power Company in gas lines leading to homes at Decatur, Illinois. In addition, ¾" vinyl pipe is being inserted in reamed-out 1¼" iron pipe under streets to avoid breaking the pavement to repair leaking gas lines. Kraloy Plastic Pipe Company, Los Angeles, California, makes the pipe. B.F.Goodrich Chemical Company supplies the Geon rigid vinyl.

B.F.Goodrich Chemical Company
a division of The B.F.Goodrich Company

B.F.Goodrich

GEON polyvinyl materials • HYCAR rubber and latex • GOOD-RITE chemicals and plasticizers

Check 3317 opposite last page.

Filtering out of pigment is eliminated

Uses: Coloring for polyester resins.

Features: Utilization of fluid colors preclude agglomeration and filtering out of pigment. This is said to reduce number of rejections attributable to color variance.

Description: Amount of fluid toner color required is determined by type of resin mix used. Unfilled laminates need as little as 0.1 to 0.5%. Formulations containing fillers may require from 1 to 10%. Degree of opacity is also governing factor in determination of color quantity necessary.

(Fluid toner colors are product of General Industrial Division, Sherwin-Williams Co., 101 Prospect Ave., N.W., Cleveland 1, Ohio.)

Check 3318 opposite last page.

Soybean polyepoxide boasts 7% oxirane oxygen content

Product's high purity means higher functionality

Uses: In manufacture of resins and coatings, and as acid acceptors for use in corrosion inhibition and stabilizing plasticizers for resins.

Features: Formation of hydroxylated and polymeric by-products is minimized by production process, thus increasing purity. Oxirane oxygen content of 7% means higher functionality.

Description: Reactive polyepoxide is derived from soybean oil by process giving up to 96% conversion of unsaturated fatty esters. Having four epoxide groups per molecule, it is the first in a series of epoxidized fatty esters being made by this process.

Product is lower in viscosity and more compatible with non-polar resins, particularly polyvinyl chloride.

(Epoxol 7-4 is development of Technical Products Department, Swift & Company, 1800 165th St., Hammond, Ind.)

Check 3319 opposite last page.

Abrasion test on spun synthetic yarn sized with acetate gum is set up. Results of mill tests indicated that gum gave 1 to 2% higher weaving efficiency than those of starch products previously used

Test specimen is studied on viscometer. Material exhibits viscosity stability on cooling, aging, and reheating

Uniform acetate gums from corn-starch acetylation

. . . up weaving efficiencies as warp sizing

Uses: Warp sizing for fine combed-cotton and worsted yarns (Miralloid); warp sizing for spun synthetic yarn (Mira-Film).

Features: Corn-starch acetylation process utilized produces uniform acetate gums which increase weaving efficiency.

Miralloid — In extended tests on fine combed-cotton yarns, number of warp stops was reduced 1.5% by utilization of gum. Number of warp stops per loom-hour was 0.135, as compared to 0.320 warp stops with size previously used.

Mira-Film — On a 90/10 viscose-acetate blend, product gave 1 to 2% higher weaving efficiencies than starch product previously utilized. Also, it has been used without resin adjuncts to successfully size 60/40 blends of cellulose triacetate and viscose. In combination with polyvinyl alcohol, acetate gum has increased weaving efficiencies of 100%-polyester yarns.

Description: Miralloid — Chemical substitution of acetate radicals into polymeric chains of starch reduced tendency to cling together to form bundles or micelles. Chains are therefore more easily disassociated during heating or cooking. They are also less likely to reassociate them-

CALL Nalcamine G-13 whatever you like. Our chemists call it 1-(2-hydroxyethyl)-2-heptadecenyl-2-imidazoline . . . but remember it is *a cationic surface-active tertiary amine* with almost unlimited use possibilities... As an emulsifier, a demulsifier, an antistatic agent, an *adjustable* water- or oil-soluble salt, a wetting agent, a dispersing agent, and so on and on.

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Nalco CHEMICALS

Check 3320 opposite last page.

selves in cooked paste. Gum gelatinizes over range approximately 10 to 15°F lower than that of native corn starch. Material exhibits viscosity stability on cooling, aging, and reheating.

In tests, pastes were brought to boiling point in 30-minute cycle. They were boiled 15 minutes with live steam. Concentrations were 1 lb/gal of finished size. Gel strength of various homogenized samples after cooling and aging was less than 40 gram-centimeters.

In typical mill application, viscosities over eight-hour period were found to be more stable than those of starch used previously. Test results were as follows:

	Gum	Starch
Average storage-kettle viscosity, sec*	14	14
Size box viscosity variations, sec	13.5-14.5	8.5 - 14
Size box viscosity variations, sec	55 - 60	48 - 60

*Viscosities expressed in seconds were determined with brass cup of 1/4" aperture.

Mira-Film — Gums are acetate esters of corn starch producing non-congealing pastes with basic flow properties resembling those of hydroxy-ethyl-ether derivatives of starch. Product exhibits low gelatinization temperatures over temperature range of approximately 10 to 15°F lower than that of native corn starch. Cooking at normal concentrations requires 30 minutes. Pastes are stable during cooling and can be used in size box at temperatures as low as 120°F.

Acetate gums produce strong flexible films with good abrasion resistance. Following results were obtained in comparison (on Walker abrader) of product with other sizes on 20/1 spun acetate yarn:

Size Type	Abrasion Strokes
None	9
Starch ether	33
Other starch derivative	30
Acetate gum	43

(Mira-Film and Miralloid acetate gums are products of A. E. Staley Manufacturing Company, Decatur, Ill.)

Check 3322 opposite last page.

kill foam with a Dow Corning SILICONE DEFOAMER

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62,500 lb hypo fix and film developer
6,250 lb acetic acid-wood alcohol distillation mix

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Check 3321 opposite last page.

CPH-4

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for use as
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Carrier
Solvent
Wetting Agent
Detergent
Solubilizer
Lubricant
Plasticizer
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for use in production of
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Check 3323 opposite last page.

THAT'S INTERESTING

Jack of all trades

Wide array of uses ranging from starting cook fires to paint thinning and assorted cleaning chores is claimed for home fluid now available in quart-size metal cans. W. H. Barber Chemical Co. says its fluid is dispensed by a plastic squirt spout which is part of the metal screw cap. Spout is put into use by pulling it from cap and inverting it through cap opening.

Did you know that . . .

earth revolves around the sun at 0.00000190 rpm; a minute hand moves at rate of 0.01667 rpm; propellers on a Constellation airliner spin at about 2800 rpm, and an ultra centrifuge has been operated at speeds up to 48 million rpm. At least that's what *Monsanto Magazine* says.

For more information on product at right, specify 3324 see information request blank opposite last page.

General Mills announces...

24 NEW Fatty Nitrogen* Chemicals...

* Fatty Nitrogen Chemicals

RNH_2 R_2NH

$RNH(CH_2)_3NH_2$

R_3N $\left[R^2-\overset{\overset{R^1}{|}}{\underset{\underset{R^3}{|}}{N}}-R^4\right]^+ Cl^-$

Above left, fatty primary amine; *above right,* fatty secondary amine; *center,* fatty diamine; *lower left,* fatty tertiary amine; *lower right,* fatty quaternary ammonium chlorides.

every one an opportunity for creative chemists

From General Mills continuous research come 24 new Fatty Nitrogen Chemicals. These are quality products—exceptionally pure, always uniform. We hope you see among them—or among the other Fatty Nitrogen Chemicals in our broad line—an opportunity for your company. Be sure to take a close look at our Aliquats—Fatty Quaternary Ammonium Chlorides. They promise unusual opportunities for forward looking men. You can be among the first to take advantage of their full potential.

New Fatty Quaternary Ammonium Chlorides (Aliquats)

Product	Description	Quaternary Ammonium Compound	% Sodium Chloride	pH
Aliquat 5	myristyl trimethyl ammonium chloride	48-52	1 max.	9 max.
Aliquat 7	stearyl trimethyl ammonium chloride	48-52	1 max.	9 max.
Aliquat 11	oleyl trimethyl ammonium chloride	48-52	1 max.	9 max.
Aliquat 15	oleyl-linoleyl trimethyl ammonium chloride	48-52	1 max.	9 max.
Difatty Dimethyl Ammonium Chlorides				
Aliquat 204	dilauryl dimethyl ammonium chloride	73-77	0.5 max.	9 max.
Aliquat 205	dimyristyl dimethyl ammonium chloride	73-77	0.5 max.	9 max.
Aliquat 206	dipalmityl dimethyl ammonium chloride	73-77	0.5 max.	9 max.
Aliquat 207	distearyl dimethyl ammonium chloride	73-77	0.5 max.	9 max.
Aliquat 215	di (oleyl-linoleyl) dimethyl ammonium chloride	73-77	0.5 max.	9 max.
Trifatty Methyl Ammonium Chlorides				
Aliquat 336	tricaprylyl monomethyl ammonium chloride	73-77	0.5 max.	5-7
Quaternized Fatty Diamines				
Aliquat 721	Quaternized coco diamine	48-52	1.0 max.	9 max.
Aliquat 726	Quaternized tallow diamine	48-52	1.0 max.	9 max.

New Primary, Secondary and Tertiary Fatty Amines (Alamines)

Product	Description	Amine Value	Iodine Value	% Primary Amine
Primary Fatty Amines				
Alamine 5	primary myristyl amine	244-264	3 max.	87 min.
Alamine 5D	distilled primary myristyl amine	255-265	3 max.	97 min.
Alamine 15	primary oleyl-linoleyl amine	190-200	90 min.	87 min.
Alamine 15D	distilled primary oleyl-linoleyl amine	200-210	90 min.	97 min.
Secondary Fatty Amines				% Secondary Amine
Alamine 204	secondary lauryl amine	153-167	3 max.	85 min.
Alamine 205	secondary myristyl amine	132-143	4 max.	85 min.
Alamine 206	secondary palmityl amine	116-126	5 max.	85 min.
Alamine 207	secondary stearyl amine	100-110	5 max.	85 min.
Alamine 215	secondary oleyl-linoleyl amine	105-115	90 min.	85 min.
Tertiary Fatty Amines				% Tertiary Amine
Alamine 304	trilauryl amine	98-116	3 max.	90 min.
Alamine 321	tricoco amine	91-107	5 max.	90 min.
Alamine 336	tricaprylyl amine	132-142		90 min.

CHEMICAL DIVISION

General Mills

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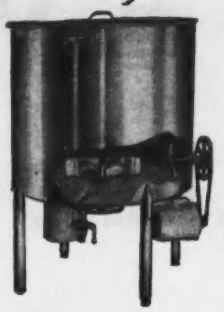

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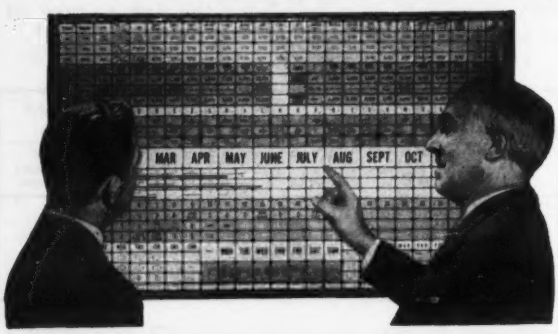

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Check 3326 opposite last page.

Weathering resistance of vinyls improved with plasticizers

Epoxy-containing compounds resist fungus attack

Uses: Plasticizers for vinyl resins and as vinyl-chloride stabilizers.

Features: Improve resistance of vinyl plastics to outdoor weathering.

Description: Di(2-ethylhexyl)-4,5-epoxy tetrahydrophthalate is similar in plasticizing properties to dioctyl phthalate, but is less volatile, has a stronger solvating power, and somewhat higher brittle temperature.

The second plasticizer, di-(iso-decyl)4,5-epoxy tetrahydrophthalate, is similar to di-(iso-decyl) phthalate, but is less volatile and more resistant to extraction by oil.

Both are effective heat and light stabilizers and resist fungus attack. They are compatible with vinyl chloride resins at concentrations as high as 70 parts of plasticizer to 100 parts of resin.

(Flexol plasticizers 107-D and 163-D are products of Union Carbide Chemicals Company, division of Union Carbide Corporation, 30 East 42nd St., New York 17, N.Y.)

Check 3327 opposite last page.

PVP/VA copolymer in solid form

Uses: In manufacture of adhesives, paper coatings, inks, flexible finishes, sizes for glass fibers, protective coatings.

Features: Vinylpyrrolidone/vinyl acetate copolymer is available commercially in solid form.

Description: Copolymer represents monomer ratio of 60% vinylpyrrolidone and 40% vinyl acetate. With K-value of 30, corresponding to a mean molecular weight of 40,000, it forms stable suspensions in water and may be incorporated into aqueous or organic solvent systems.

It is designed for use wherever it is necessary or de-

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sirable to avoid alcohol. Unique film-forming and adhesive properties, broad solubility range, and exceptional compatibility characteristics are reported.

(PVP/VA S-630 is available from Antara Chemicals, sales division, Dyestuff & Chemical Division, General Aniline & Film Corporation, 435 Hudson St., New York, N.Y.)

Check 3330 opposite last page.

Molybdenum-tungsten line increased by six

Six new materials have been added to line of molybdenum and tungsten chemicals.

Phospho and silico molybdic acids are distinguished by extraordinarily high rates of solubility in water. Also, they are soluble in some organic solvents (ethers, alcohols and ketones). Both heteropoly acids are strong oxidizing agents and can be readily changed to fairly stable reduced compounds. Investigations indicate that they play important roles as catalysts, organic precipitants, and corrosion inhibitors.

Molybdenum dichloride and trichloride have high melting points and are relatively stable. They appear to be useful as intermediates in preparation of organo-molybdenum compounds. They form interesting groups of addition and substitution products when combined with organic solvents.

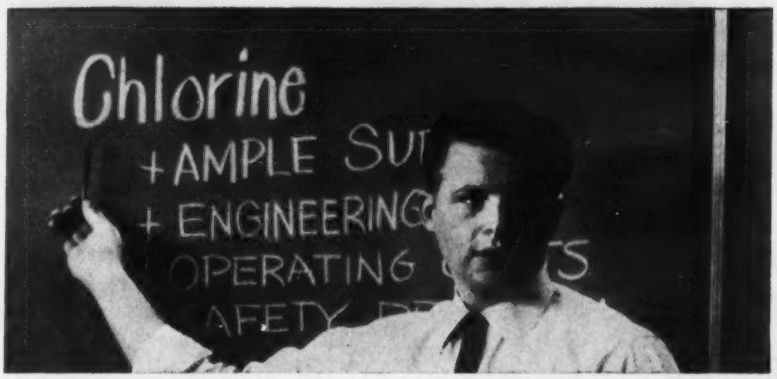
Tungsten pentabromide shows promise as intermediate for production of fully substituted organic tungsten compounds. This promise as intermediate is also true for **molybdenum tribromide.**

(Molybdenum dichloride, molybdenum tribromide, molybdneum trichloride, phospho 12 molybdic acid, silico 12 molybdic acid, and tungsten pentabromide are products of Climax Molybdenum Company, Division of American Metal Climax, Inc., 500 Fifth Ave., New York 36, New York.)

Check 3331 opposite last page.

BRIEFS

on 4 chlorine "pluses"... a caustic soda guide... 3 built-in sodium sulfide controls... an important sulfide drum



You get these 4 pluses when you ask for *Hooker* chlorine

1. **Engineering help.** You can get aid from Hooker engineers in planning or revamping your chlorine handling system.

2. **Operating hints.** Our technical service men can often spot—and help you fix—troubles before they become serious. You get periodic technical service visits.

3. **Safety programs.** We keep you up to date on the safest and most economical handling methods.

4. **Ample supply** from Hooker plants which bridge the continent: Niagara Falls, Montague, Mich., Tacoma, and North Vancouver. And, of course, you get a chlorine that meets high industry standards when you ask for Hooker.

Send the coupon for our Chlorine Manual, 76 pages of useful facts on chlorine, its handling and usage.

Phone or write the nearest Hooker sales office for further information on how we can help you.

Fact-filled guide book gives data on handling caustic soda safely

Here is a practical, easy-to-use book on the safest ways to store and handle liquid caustic soda.

It tells you how to unload a tank car, gives methods for diluting caustic soda to different strengths, tells how to store efficiently and with least risk of iron pickup.

Large, detailed diagrams show you the equipment to use. 18 charts, graphs and tables help you foretell how caustic soda will act under a wide range of working conditions.

Get your free copy by checking the coupon.

Why our sodium sulfides are always full strength

Take a look at this drum.

It was planned to bring Hooker sodium sulfide and sulfhydrate to you at full strength and to keep it that way until it's used up in process.

This drum is lacquer-lined. It is sealed with lacquer around the cap. Six sturdy lugs hold the cap fast during handling and storing.

There's another reason you always get Hooker sodium sulfides at full strength—we use only new containers.

Check the coupon for specifications.

For more information on chemicals mentioned on this page, check here:

☐ Hooker Chlorine Manual ☐ Sodium Sulfide Data Sheet

☐ Hooker Caustic Soda Guide ☐ Sodium Sulfhydrate Data Sheet

Clip and mail with your name, title, and company address.

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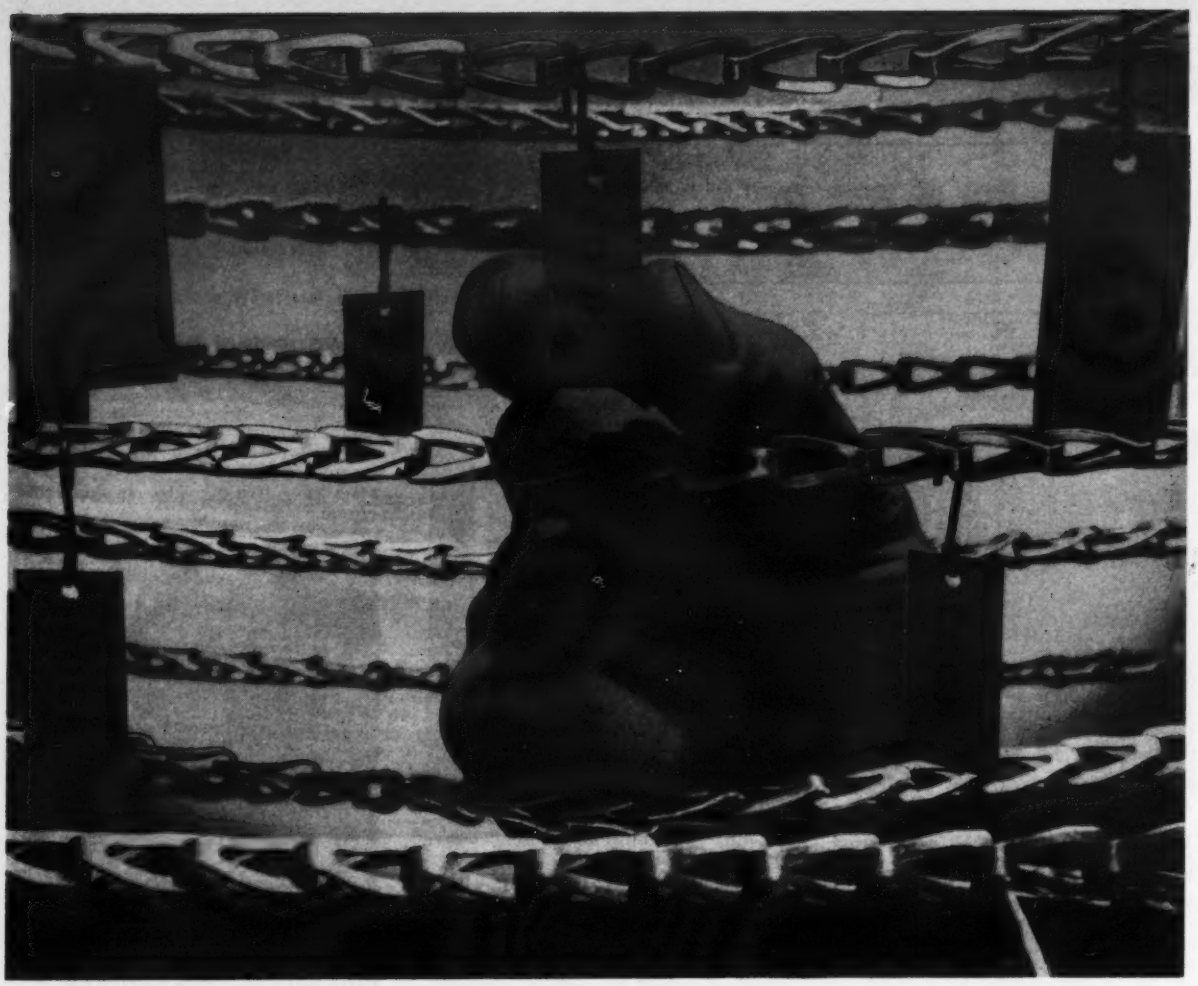
HOOKER CHEMICALS PLASTICS

Check 3332 opposite last page.



Use METHACRYLIC ACID or ACRYLIC ACID to add carboxyl groups to polymer chains

Would you like to add carboxyl groups to a polymer? Methacrylic acid and acrylic acid provide the answer. Adding COOH radicals to polymers by copolymerizing with one of these monomers may contribute benefits such as 1) improved adhesion properties, 2) better freeze-thaw and mechanical stability in polymer emulsions, 3) solubility in alkalies, including ammonia, 4) reactive centers for cross-linking by agents such as zinc oxide, diamines, or epoxides, 5) improved oil resistance, and 6) increased hardness, softening temperature, and abrasion resistance. Methacrylic acid and acrylic acid can be copolymerized with monomers such as styrene, acrylonitrile, butadiene, isoprene, acrylates, methacrylates, vinyl chloride, vinyl acetate, vinylidene chloride, and divinylbenzene.

Write to Dept. SP-16 for technical literature on these monomeric acids.

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Check 3333 opposite last page.

Phosphinoborine molecule is synthesized

Discovery may be key to heat-stable plastics

Synthesis of phosphinoborine molecule may lead to development of heat-stable plastics that can withstand temperatures up to 750°F. Most plastics are stable only to 300°F.

Two basic types developed are: 1) translucent, milky white compound that resists heat but is brittle; and 2) compound that resembles existing plastics but lacks heat stability.

Problem is to combine plasticity and heat-stability into commercially suitable product.

Boron-phosphorus molecule is described as a linear chain of repeating, tetracoordinate phosphinoborine units. Molecular weight is 12,500.

(Phosphinoborine is development of American Potash & Chemical Corporation, 3000 W. Sixth St., Los Angeles 54, Calif.)

Check 3334 opposite last page.

Outdoor use of plastics extended by absorber

Uses: Stabilizes polyethylene and polypropylene plastics for outdoor use.

Features: Pale-yellow powder supplements carbon black as ultraviolet-light absorber compatible with polyethylene and polypropylene. Use is expected to increase consumption of former 10 to 50%.

Description: Absorbs strongly in 300-375mμ range of ultraviolet. Long alkyl group (n-octyl) at ether linkage makes it compatible with polyolefins. In tests in sunlight, 10-mil polyethylene sheets containing 0.171% of absorber retained 85% elongation after two months, while untreated sheets retained only 9%.

(UV 314 is development of Organic Chemicals Division, American Cyanamid Company, 30 Rockefeller Plaza, New York 20, N.Y.)

Check 3335 opposite last page.

Emulphogene® BC

nonionic surfactants

Foam Stabilizers—Solubilizers—Detergency Boosters—Emulsifiers

Emulphogene BC nonionic surfactants are alkylpoly(ethyleneoxy)ethanols that differ from one another in ethylene oxide content. By using the appropriate product, or by mixing them, various degrees of hydrophilic-hydrophobic balance can be obtained.

Highest Degree of Water Solubility

Emulphogene BC-840

LIQUID MANUAL-DISHWASHING FORMULATIONS

Highly effective, economical foam stabilizer for alkylarylsulfonates; most efficient solubilizer. Increases detergency, aids in grease emulsification.

Soluble in water and water-miscible solvents

Emulphogene BC-720

Equally effective as BC-840 in liquid manual-dishwashing formulations, but easier to handle because it is liquid at room temperature and less viscous.

More Water-Soluble than BC-420 Oil Dispersible

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IN PULP AND PAPER MANUFACTURE

More effective than soap or alkylarylsulfonates in the deresination of sulfite pulps.

NEUTRAL WOOL SCOURING

Excellent scouring agent at relatively low temperatures. Makes wool run better on cards and combs. . . .

Insoluble in water, soluble or dispersible in petroleum based solvents

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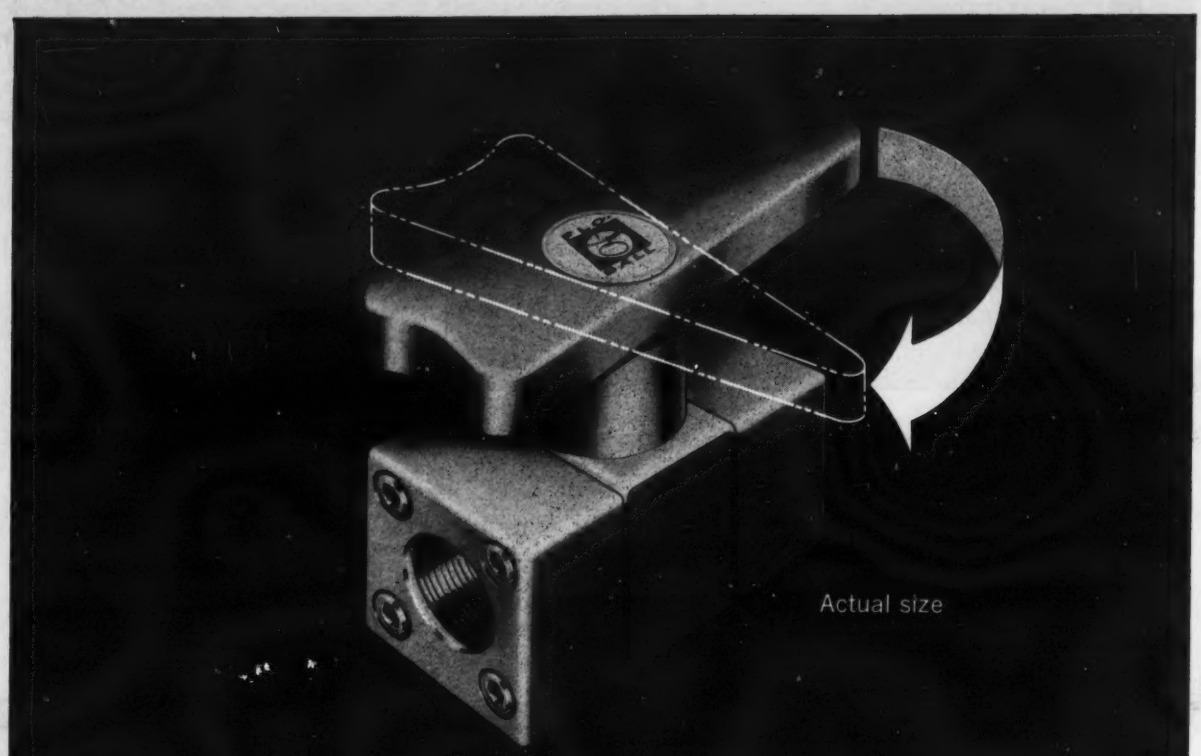
Emulphogene BC surfactants manufactured by General Aniline & Film Corp. are sold outside the United States and Canada under the tradename "Mulgofen BC" by distributors all over the world.

Check 3336 opposite last page.



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Check 3337 opposite last page.

Polystyrene color stability good under light effects

Uses: In light diffusers, fixtures and grids.

Features: Performance under accelerated aging tests revealed yellowing only 1/7 of the allowable maximum specified by Council of Illuminating Engineering Society in 1958.

Description: Polystyrenes are available for molding (672) and extrusion (673). Color stability test results were supported by 17,000 hr of exposure to standard cool white fluorescent light.

(Styron Verelite 672 and 673 are products of The Dow Chemical Company, Midland, Mich.)

Check 3338 opposite last page.

Dialdehyde starch now produced in quantity

Uses: Making of plastics, other polymers, coatings, binders, thickening agents, adhesives; and as cross-linking agent in chemical reactions.

Feature: Lower cost due to commercial production.

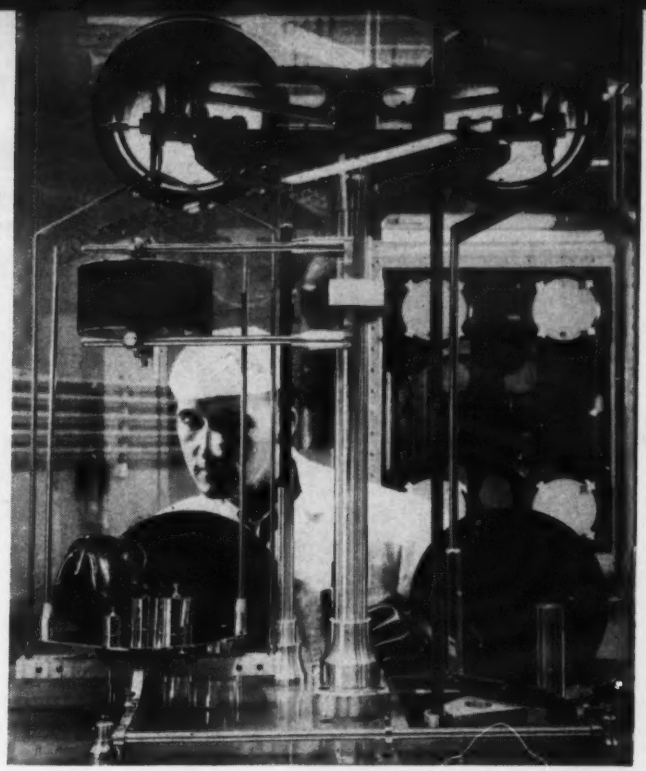
Description: Dialdehyde starch is made by oxidizing corn starch with periodic acid. Commercial production was achieved by electrolytic means.

Additional applications research is needed to fully explore potentialities. Hard translucent plastic results when heat and pressure are applied to starch. Also, feasible processes have been developed for making erythrose, glyoxal, and erythritol from the starch.

(Dialdehyde starch is being produced commercially by Abbott Laboratories, North

Check 3339 opposite last page.

For more information on developments reported in this section, check corresponding numbers on Reader Service Slip opposite last page of this issue.



Weighing specimen of plutonium. All equipment is housed in hoods or glove boxes having helium atmosphere

New $4 million AEC installation marks another milestone in the advancement of nuclear fuel technology. Designed to develop fabrication techniques for a hazardous material, unique facility . . .

Makes Plutonium Fuel Elements

Use of plutonium in nuclear power reactors took a big jump forward with the recent opening of AEC's Argonne National Laboratory fuel fabrication facility. Built and equipped at a cost of $4 million, the Lemont, Illinois, installation will be used to develop improved techniques for fabricating plutonium fuel elements and to produce experimental fuel elements for use in several of the laboratory's nuclear reactors.

Plutonium is a tricky element to work with. It is highly radioactive and toxic. The material does not occur in nature. It is produced from U-238 by a series of nuclear reactions.

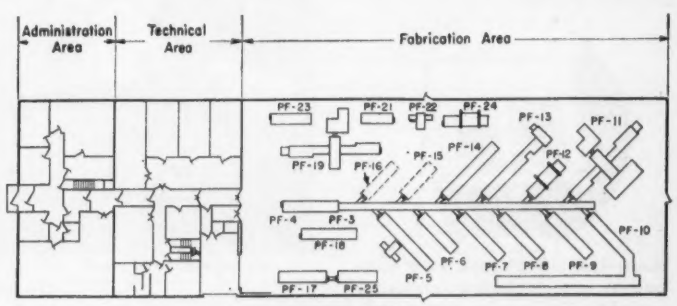
The best use appears to be as fuel for fast power-breeder reactors, a number of which are currently under construction or planned. Such units not only produce power but also "breed" more plutonium than they consume. However, one can not simply take the plutonium out of a breeder reactor and shovel it back in as fuel. The plutonium must be fabricated into fuel elements before it is useable. This is where facilities like the one at Lemont will come into the picture.

Designed for Safety, Flexibility

The Argonne installation has been built to fill the need for a fabrication process development laboratory, a pilot plant, and a facility for limited production. It is equipped with machinery of sufficient size, flexibility, variety, and capacity to be useful for the manufacture of a wide variety of plutonium fuel element loadings. It is designed to assure maximum safety to operating personnel and give complete protection to the surrounding area against spread of radioactivity.

Four types of work are carried out. These are: 1) Fabrication directly on fuel cores; 2) Assembly, welding, and bonding of previously fabri-

Building has 106 hoods connected together in herringbone pattern



PROCESS LINE

PF- 3 CONVEYOR
PF- 4 INTRODUCTION & REMOVAL
PF- 5 MACHINE SHOP
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PF-11 ROLLING MILL "A"
PF-12 PLATE SHEAR
PF-13 WIRE FABRICATION
PF-14 PRESS WORK
PF-15 FUTURE LINE
PF-16 FUTURE LINE
PF-17 WELDING AND CLADDING
PF-18 DECONTAMINATION
PF-19 ROLLING MILL "B"
PF-21 WORK BENCH
PF-22 MILLING MACHINE
PF-23 LATHE
PF-24 PLATE SHEAR
PF-25 LIQUID METAL FILLING

Fuel fabrication facility is housed in 245' by 72' building

Here's Why CHEMICAL MEN specify...

EC&M
OIL-BREAK STARTERS
(2200-4800 VOLTS)

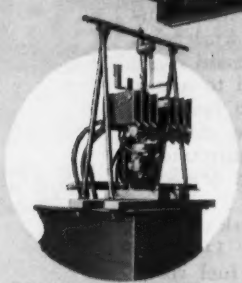
—THEY'RE Specifically Designed
FOR DUSTY, CORROSIVE ATMOSPHERES

Exterior and interior views of EC&M Type ZHS High Voltage Starter in NEMA 3R (raintight) enclosure with threaded connections for conduit

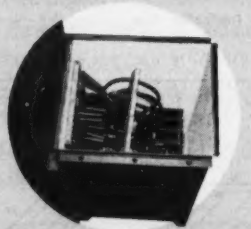
EC&M Type ZHS Starters are a "natural" for chemical plant service because the high interrupting capacity ZHS contactor operates under oil. Being totally oil-immersed, this contactor is always well lubricated, protected from corrosion and requires infrequent inspection. There are additional advantages—

QUICKLY INSTALLED because starters are shipped with all internal wiring complete. These ready-to-use starters cut installation time and cost.

HIGH INTERRUPTING CAPACITY • These EC&M Starters are available in enclosures for indoor or outdoor mounting, and are supplied in 3 ratings—*(1)* 50,000 KVA (certified) interrupting capacity (inherent in the starter)—*(2)* with power-type, current-limiting fuses—*(3)* VALIMITOR® (volt-ampere-limitor), the bus may be of unlimited KVA.



With EC&M contactor-lifter, contactor is easily raised above oil level for easy inspection without disconnecting any bolts or leads



Down-view into oil tank. Note compactness of contactor and transformer assembly. All leads are anti-syphon

An installation of two EC&M 2300 volt, reversing dynamic braking starters in a large rubber plant

For the complete story, write for Bulletin 8130-CH

THE ELECTRIC CONTROLLER & MFG. CO.
A DIVISION OF THE SQUARE D COMPANY
CLEVELAND 28 • OHIO

8170

Check 3340 opposite last page.

cated cores into non-radioactive jacket materials; 3) Metal working, machining, cutting, or heat treating operations on jacketed pieces; and 4) Inspection or other operations upon finished fuel elements for which no protection is required.

To insure maximum safety, equipment is mounted in an integrated system of hoods or glove boxes. Gasketed together to prevent air leakage, hoods have helium atmosphere to prevent fires caused by oxidation of fuel during fabrication. There are 106 hoods in the building. Ranging in volume from 18 to 800 cu ft, they are connected together in a herringbone pattern (see drawing on preceding page). A single shuttle car, riding on rails, is used to convey items through the system.

Processing equipment of standard design was installed if it was readily adaptable to glove box enclosure and operation. Most units, however, were found to require some modification for gas-tight housing or for access to parts requiring maintenance or manipulation.

Has Three Areas

The building, 245′ long and 72′ wide, has a height of 24′ above grade. There are three working zones, divided according to use and possible radiation hazard. These are: 1) Administration area, 2) Technical area, and 3) Fabrication area. Each is completely sealed from the others. Access between areas is achieved by means of air locks.

Main exterior walls are monolithic reinforced concrete, sealed on the outside with polyester plaster coating and painted on inside with vinyl paint. All floors in areas where there is risk of radioactive contamination are covered with built up fiberglass and polyester coating. Basement floors and floors bearing on the ground are sealed in same manner.

Air is supplied to each of the main operating areas by means of a separate air conditioning system. Replaceable

To bottom of page 69

* **Ammonium Nitrate Phosphate**
(26-26-0)

Ammonium Phosphate
(21-53-0)

Ammonium Nitrate
(from 83% solution)

Urea
(from 70% solution)

Complex Fertilizer
(all ratios and grades)

Ammonium Sulphate

Ammonium Nitrate Limestone

C&I's new SPHERODIZER PROCESS† can pelletize solutions and slurries for the production of high analysis fertilizer without utilizing prilling or other costly granulating methods. Outstanding advantages of the Spherodizer Process are: comparatively low capital investment in plant; a recycle rate less than 20%; exceptional flexibility in that the process can spherodize any slurry and low concentrated solutions. The Spherodizer Process produces a uniform, homogenous, and symmetrical pellet in any desired size range that can be stored in bulk or bags. Plants are available in any desired capacity.

Let our free, illustrated brochure give you all the details, graphically. Product samples on request.

†PATENTED.

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THE CHEMICAL AND INDUSTRIAL CORP.

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Check 3341 opposite last page.

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- **Water Transmission Valves** for public commercial-industrial installations. V-612.

Whatever your valve needs, you can select from the Rockwell-Nordstrom complete line of lubricated plug valves, lubricants and plug valve accessories. Write today for details: Rockwell Manufacturing Company, Pittsburgh 8, Pa. Canadian Valve Licensee: Peacock Brothers Limited.

ROCKWELL-Nordstrom VALVES

another fine product by

ROCKWELL

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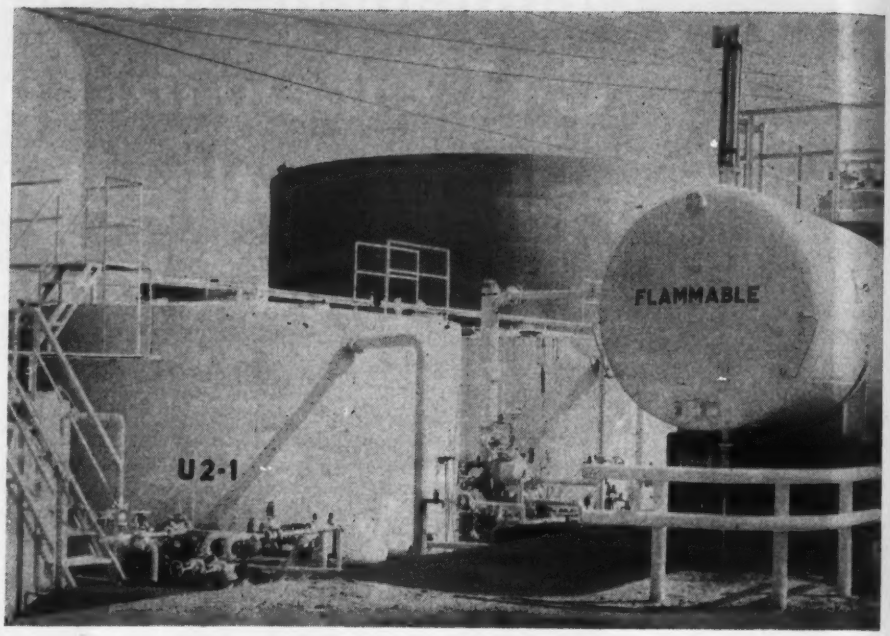


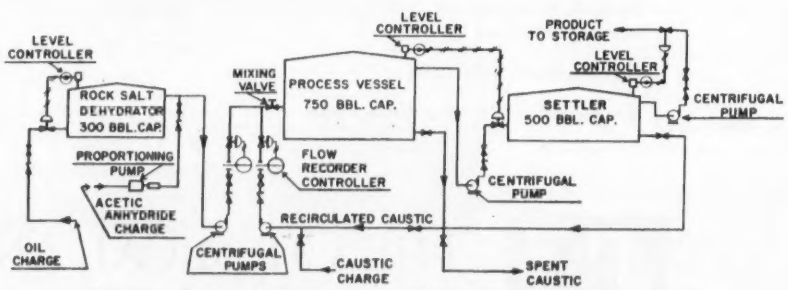
Upgrades petroleum distillates for as low as 3 mills per bbl

Low-cost process requires minimum equipment investment, has no disposal problems, needs little supervision

Petroleum distillates are now being upgraded through use of an economical, efficient process that can be put on stream for an equipment investment cost of 50 to 75 cents per barrel of processing capacity. The technique can be used on light fraction stocks such as heating oils, solvents, jet fuels, gasoline, kerosene, and other distillates.

Known as Nalfining, process eliminates odors, reduces sludge formation, and improves stability. It converts mercaptans to unreactive, odorless chemicals. Nitrogen-containing impurities are changed to harmless reaction products. There are no disposal problems connected with the process.

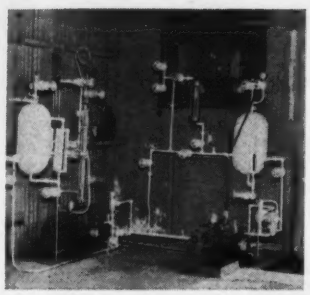
Paraffinic or aromatic fractions suitable



Flow diagram of installation processing 20,000 bbl per day of light cycle oil

Nalfining system handles 20,000 bbl of light cycle oil per day. Tank at left (U2-1) and similar unit behind it, have 750 bbl capacity, serve as process vessels. Partially visible at extreme left is 300 bbl unit for spent caustic. Aluminum tank at right stores acetic anhydride

for solvent use are reported to be readily improved by the technique. Odor frequently limits use of these stocks as high quality solvents. Refinery units processing 1000 barrels per day have shown that the process can convert these materials into candidates for the premium solvent market.



Proportioning pumps and auxiliary equipment used for regulating flow of acetic anhydride in 20,000 bbl per day installation

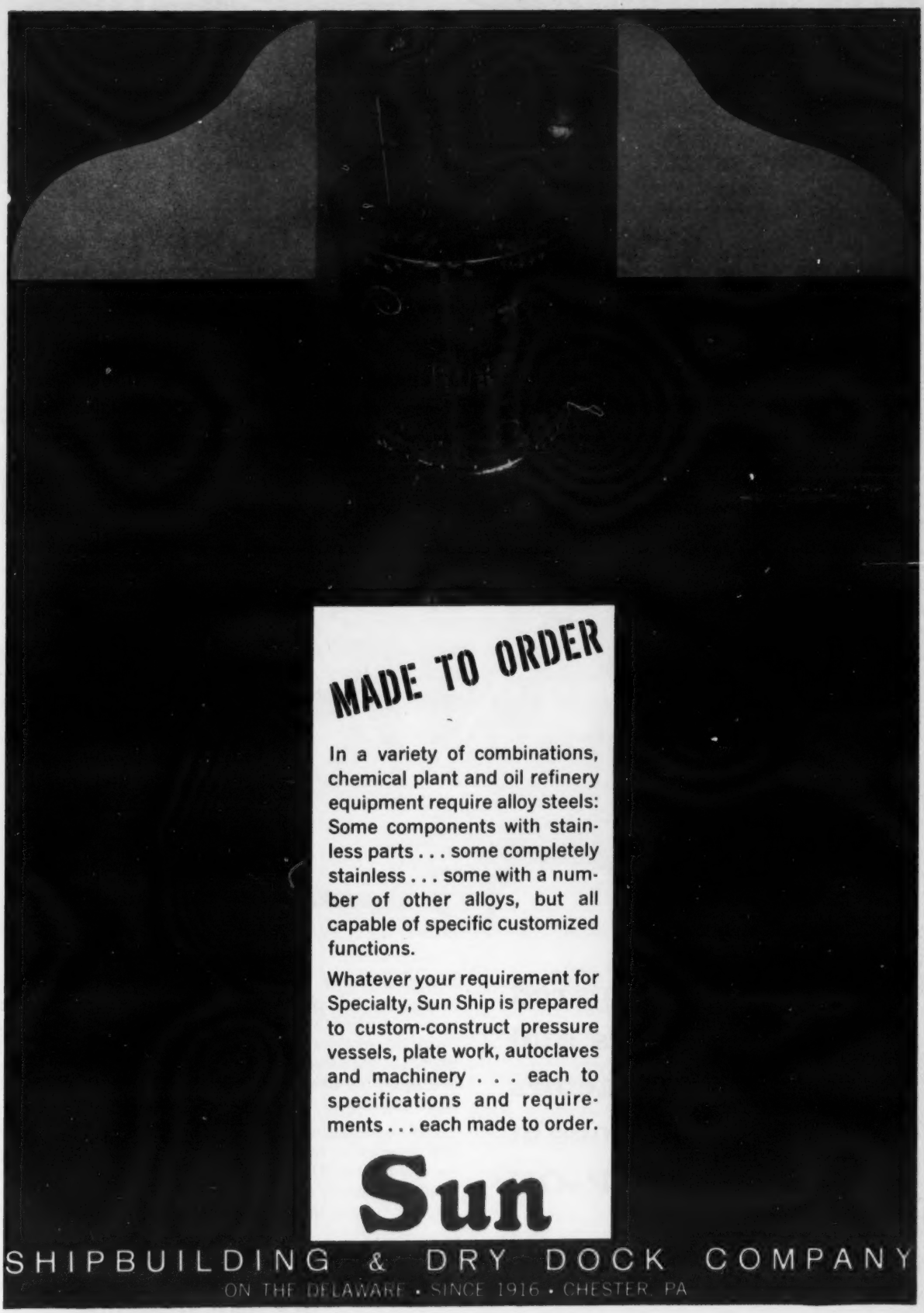
Volumes up to 20,000 barrels per day of heating and diesel oils are being processed. Two years of refinery operation with these products have demonstrated that treated stock retains good resistance to degrading during transportation, storage, or use.

Uses Acetic Anhydride

Process is based on interaction between acetic anhydride and unstable, reactive components in the hydrocarbon. This operation is followed by treatment with concentrated caustic. Installation is simple and there is no need for expensive instrumentation and control. Process vessels or treating tanks from existing caustic or acid treating operations can generally be adapted to the process.

Aluminum storage tanks, pumps, and lines to handle

To page 69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In a variety of combinations, chemical plant and oil refinery equipment require alloy steels: Some components with stainless parts . . . some completely stainless . . . some with a number of other alloys, but all capable of specific customized functions.
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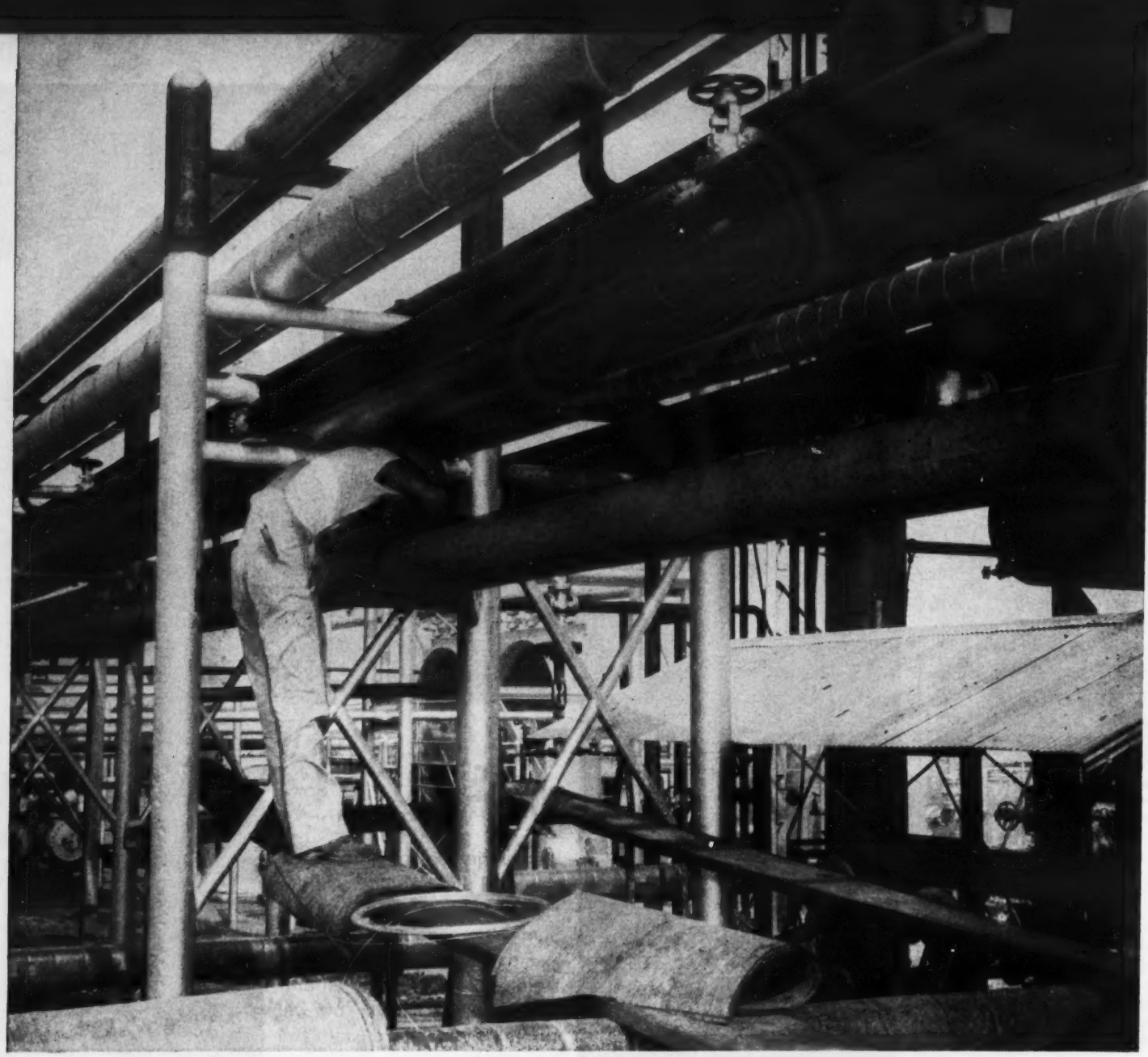

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Thermal and acoustical glass fiber insulations . . . molded glass fiber pipe insulation
Couplings and fittings for plain and grooved end pipe

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WASHINGTON, D. C., Walter E. Campbell Co., Inc.
WICHITA, Kans., General Metals, Inc.

Check 3344 opposite last page.

Upgrades Distillates

From page 67

acetic anhydride are normally the only new equipment needed. Routine control tests conducted daily or once per shift assure optimum operation. Other than for running the tests, personnel requirements are nil.

Chemical Costs

Cost of process is function of quantity of unstable or reactive contaminants in process stream. Chemical cost for solvent deodorizing can be as little as 3 mills per barrel. Relatively sour streams of gasoline or light cycle oil may cost 3½ to 5 cents per barrel processed. In some cases, economics have been even further improved by installing caustic wash prior to the Nalfining unit.

For some time it has been reported that the petroleum industry needed a process to upgrade a variety of distillate stocks, with minimum of capital investment, no disposal problems, and little or no personnel requirements for unit operations. This process may have achieved this goal.

(Nalfining process is available on license basis from Nalco Chemical Company, 6216 West 66th Place, Chicago 38, Ill.)

Check 3345 opposite last page.

Plutonium Fuel Elements

From page 64

filters are used on the air supply to the technical and fabrication areas.

Air pressure differential between areas eliminates any chance of airborne radioactive dust leaking out. Technical area is kept at lower pressure than outer atmosphere. Fabrication room, where radioactive dust is most likely to originate, is held at still lower pressure.

All of air exhausted from building is filtered through high-efficiency fire-resistant

FLETCHER TORNADO-MATIC

THE ONLY CENTRIFUGAL THAT CAN CUT COSTS LIKE THIS—

COMPLETELY AUTOMATIC

Bottom Discharge ⟶

FOR EXAMPLE:

this one 48" x 30" Tornado-Matic does the work of two conventional 40" centrifugals ⟶

PROVIDES 5-WAY SAVINGS

100%	labor costs
50%	installation costs
50%	space requirements
75%	power to operate
25%	initial outlay

The new fully automatic Fletcher Tornado-Matic gives you round-the-clock production. Needs no operators. Assures absolute quality control of your product because of uniform production cycles. See page 708 in Chemical Engineering Catalog.

FLETCHER
PILOT PLANT
CENTRIFUGAL

Rugged, compact machine combines functions of extractor, separator and clarifier. Results from this test unit can be accurately scaled up to production unit.

Fletcher Tornado-Matic unloader gives you these extra *exclusive* features.

- **Contamination-Free . . .** No lubricants to leak or seep on product. No teeth on which product can catch.
- **Flexible Operation . . .** Fully adjustable as to pressure and speed.
- **Power Packed . . . . . .** Smooth unloading of difficult products.

Also available in manual and semi-automatic models F/M variable speed drive zero to maximum RPM

ASK ABOUT THE FLETCHER RENTAL PLAN

The New *Fletcher Works, Inc.* CENTRIFUGAL DIVISION

201 Glenwood Avenue • Philadelphia 40, Pa.

Send me additional information on the Fletcher Tornado Centrifugal

NAME & TITLE _____

ADDRESS _____

COMPANY _____ CITY & STATE _____

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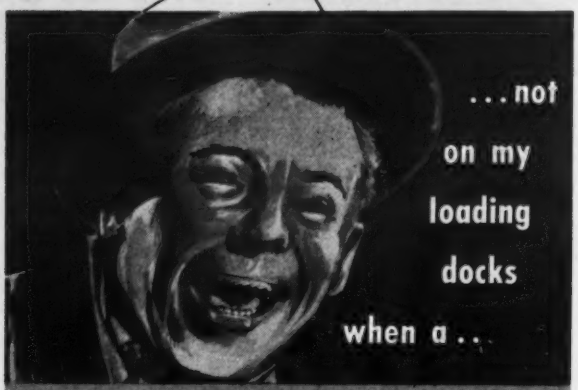
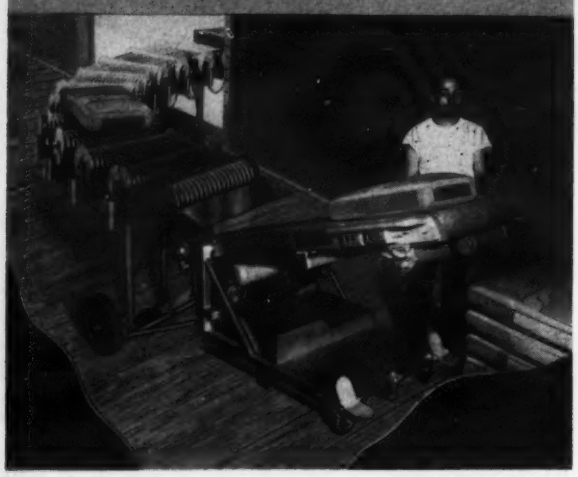
CAR LOAD BAGS BY HAND?



POWER-CURVE automatic installation will show me a healthy saving in just one season!



POWER-CURVE makes a quick payout on chemicals, loading without physical lifting, without interruption and *with just one man*... replaces a steady parade of hand trucks and labor. POWER-CURVE will flatten filled bags, route them to storage or to the dock, fill box cars or trucks from end-to-end and to full height neatly stacked against transit damage. POWER-CURVE can transfer, elevate, sort and select. It can unload, convey mixed loads, palletize and economize! It is used by dozens of chemical companies in one or more plants. It is self-powered, mobile, fully flexible and variable in height... Write for information tailored to your requirements, no obligation.

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Aluminum Company of America
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Pacific Coast Borax Co.
Morton Salt Company
Union Carbide Corp.

POWER-CURVE
CONVEYOR COMPANY
2185 SOUTH JASON ST., DENVER 23, COLORADO

Check 3347 opposite last page.

Plutonium Fuel Elements

From preceding page

filters. Units can remove 99.95% of 1/10 micron size particles. Double filter banks in series are used to remove contamination from air exhausted from all highly contaminated areas. In addition to double filtration, all air exausted from these zones is piped through 100′ stack. This permits dissipation of any gaseous radioactive process products that may remain.

(Further information about plutonium fuel fabrication may be obtained from The Argonne National Laboratory, P. O. Box 299, Lemont, Ill.)

Liquid hydrogen fuel provides greater zip to rockets, missiles

Energy content is three times that of other fuels

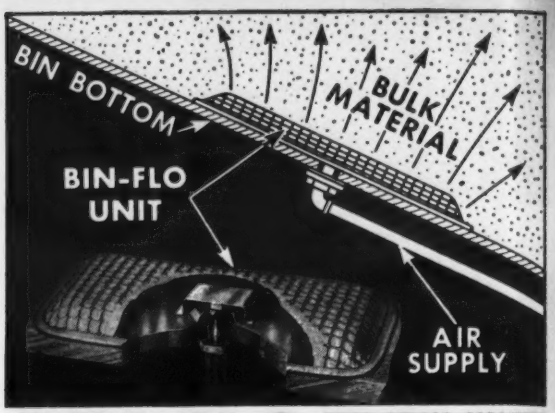
Production of liquid hydrogen for use as fuel in rockets and missiles is now in full swing. Considered to be an ultimate chemical fuel, it is currently being produced in three U.S. plants.

Liquid hydrogen has an energy content of almost three times that of other fuels. When used in combination with liquid oxygen, it gives a boost in thrust with relation to propellant expended of approximately 40% over present rocket propellants.

The liquid hydrogen is undoubtedly the purest ever made. Many technical hurdles had to be overcome to make this a reality.

An economic method of refrigeration was developed to liquefy the gas. This involved use of newly developed hydrogen turboexpanders. Temperatures produced are only few degrees above absolute zero. The system has permitted far greater operating efficiency and economy than previously considered possible.

Another problem overcome included large-scale catalytic conversion of liquid hydrogen from an unstable to a stable



BIN-FLO

USES SMALL VOLUME OF AIR AT LOW PRESSURE

KEEPS BULK MATERIALS MOVING

BIN-FLO units in bins, chutes, hoppers, etc., restore flow characteristics to dry, finely ground materials which tend to pack or bridge in storage. Types for all materials and conditions. No moving parts; simple installation; negligible operating cost; no maintenance cost.

BIN-DICATOR the original diaphragm-type bin level indicator. In successful use for over 20 years. **ROTO-BIN-DICATOR** new, motor-driven paddle type; excellent on bins under pressure or vacuum, and for general application. Also explosion-proof units, U.L. listed.

THE BIN-DICATOR CO.
13946-D Kercheval • Detroit 15, Mich.
Write for detailed literature or call
VAlley 2-6952

WE SELL DIRECT • PHONE ORDERS COLLECT

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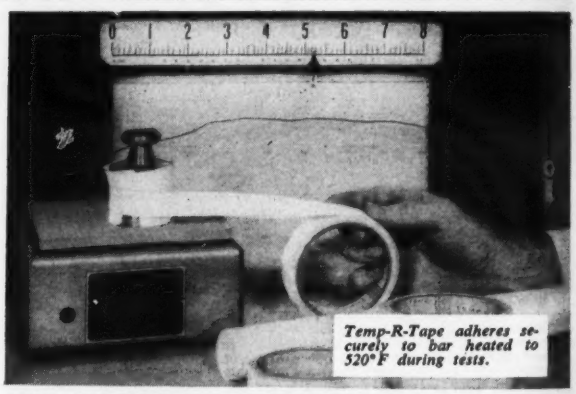

Temp-R-Tape adheres securely to bar heated to 520°F during tests.

CHR PRESSURE-SENSITIVE TEFLON* TAPES

- *−100°F to 500°F applications*
- *Class H and Class C insulation*
- *Non-stick and low friction facing*
- *Chemical resistant facing*
- *Easy to apply*

Temp-R-Tape is available from stock in rolls and sheets. All four types — Temp-R-Tape T; TH; C and TGV — combine some form of Teflon backing with silicone polymer adhesive to provide easy-to-apply pressure-sensitive and thermal curing pressure-sensitive tapes for electrical and mechanical applications. Designed for extreme temperatures, Temp-R-Tapes possess high dielectric strength, low power factor, high elongation, negligible moisture absorption, are non-corrosive and non-contaminating.

FREE SAMPLES and folder — write, phone or use inquiry service.

Sold nationally through distributors

CHR CONNECTICUT HARD RUBBER
**duPont TM*
Main Office: New Haven 9, Connecticut

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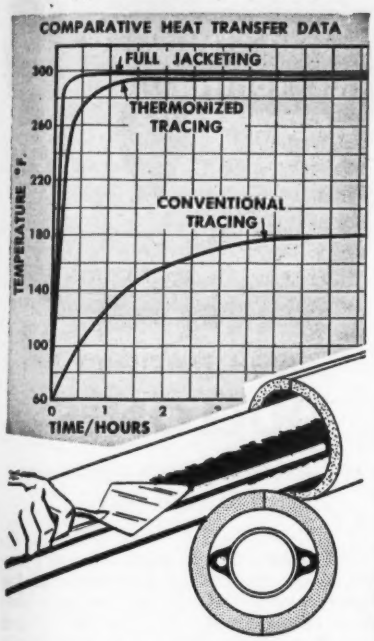
? THERMON ?

Thoroughly proved
HEAT TRANSFER CEMENT
now effecting savings up to 90% for over 1,000 users!



Thermon is a non-metallic adhesive compound with highly efficient heat transfer properties, and is easily applied over either steam traced or electrical resistance systems . . . working equally well for either heating or cooling processes.

Thermonizing has excellent heat transfer characteristics (see curves), exceeding steam traced equipment approximately 1100%, and closely approaching jacketing equipment. Thermon can be used almost without exception in place of expensive jacketing (and in many applications where jacketing is impossible), with savings up to 90%.

Write for complete technical literature on revolutionary Thermon!

THERMON
THERMON MANUFACTURING CO.
1817 Rosine • P. O. Box 1961
Houston, Texas

Check 3350 opposite last page.

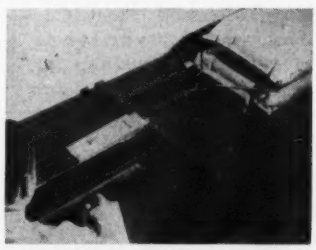
form for storage and transportation purposes. Specially designed insulated tank trailers were also manufactured. Design was based on familiar thermos bottle principle.

Two of the three plants, located at Painesville, Ohio, and Palm Beach County, Florida, were built by Air Products, Incorporated. Stearns-Roger Manufacturing Company constructed the other plant at Bakersfield, Calif.

(Information courtesy of Air Products, Incorporated, P. O. Box 538, Allentown, Pa.)

Anti-skid coated paper imparts better gripping to multiwall bags

Maximum protection against slippage of multiwall bags during transit or storage is being achieved through the use of recently developed anti-skid paper. When used for the exterior ply of multiwall bags, the material provides a gripping surface much more



Tests reveal that it takes 20% more force to dislodge 100-lb bag made of anti-skid paper

tenacious than rough finished kraft or other conventional non-slip coated papers.

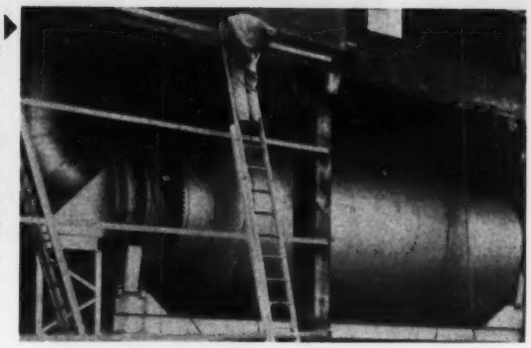
The stock is produced by treating the surface of regular finished multiwall paper with an anti-skid chemical right on the paper-making machine.

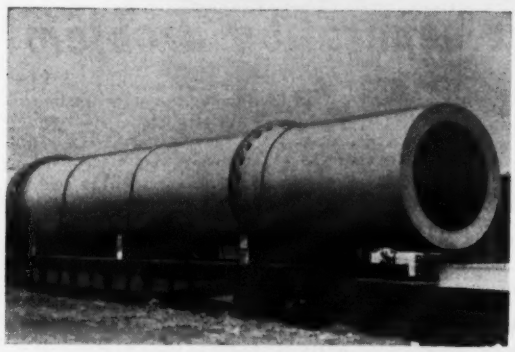
During recent tests, bags made out of the material showed 15% less slippage than bags made of rough finished kraft. In another test, 100-lb bags of material were pushed from the top of a pile of bags. It took 20% more force to dislodge the anti-skid bag.

Stock is also reported to be superior to rough finished papers on metal and wood

RENNEBURG
PROCESS EQUIPMENT
for the Chemical Industry

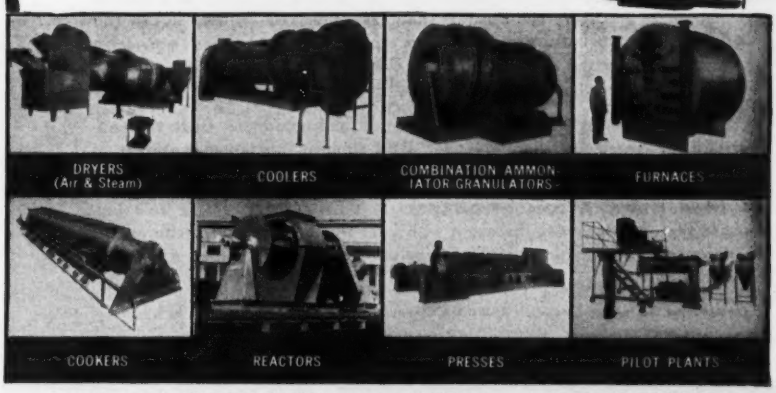
Renneburg DehydrO-Mat Cooler (Patented) — This counter-current cooler features dustless operation, large capacity, compactness, and positive *controlled* unloading.





Renneburg 8' dia. x 70' Straight Shell Dryer — Other dryers and coolers available in a wide variety of sizes and capacities.

SERVING THE PROCESS INDUSTRIES FOR OVER 80 YEARS



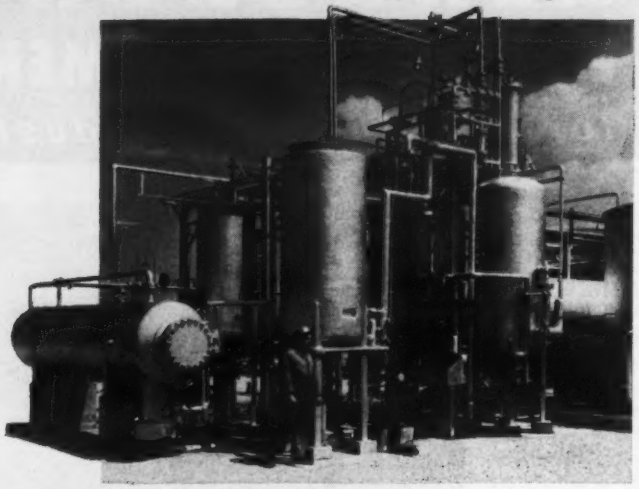
KILNS • COMBUSTION EQUIPMENT • CALCINERS • FANS • COLLECTORS
AIR POLLUTION CONTROL SYSTEMS • AMMONIATORS* • GRANULATORS*
PUG MILLS • EVAPORATORS • MIXERS • ELEVATORS • CONVEYORS • ROASTERS
*TVA Licensed Manufacturer

Literature and information on request

Edw. Renneburg & Sons Co.
2639 BOSTON STREET, BALTIMORE 24, MD

Check 3351 opposite last page.

PRODUCT IMPROVEMENT WITH PETRECO



Let's get together on your next separation problem!

ELECTROFINING* precipitation equipment has been helping to solve treating and separation problems in industry for many years. For example . . .

IN THE OIL INDUSTRY, ELECTROFINING equipment is being widely used when contacting, or "scrubbing", hydrocarbons with chemicals such as acid, caustic, doctor solution (sodium plumbite), to name a few.

IN THE CHEMICAL AND PETROCHEMICAL INDUSTRIES, ELECTROFINING precipitators are being used with significant economic success in sulfuric acid and aluminum chloride alkylation processes.

IN ANY PROCESSING OPERATION where it is advantageous to mix two immiscible liquids, the formation of stable emulsions is an ever-present and complicating possibility. ELECTROFINING has proved its ability in scores of installations to demulsify and separate the phases involved—and do so fast and efficiently. ELECTROFINING precipitation is applicable in emulsion separation problems in which the external phase is electrically non-conductive, and the internal phase is electrically conductive.

ELECTROFINING systems are closed, compact and automatic. Once the controls are set (based on laboratory pilot plant studies), operation continues at optimum efficiency with minimum attention.

IF A SEPARATION PROBLEM IS PLAGUING YOU, we'd like to have the opportunity to discuss it with you. Or, if you prefer, write or call us, describing your problem, product, type of operation, etc. There's no charge, no obligation.

*ELECTROFINING *is a registered trademark of Petrolite Corporation.*

PP-58-1

PETROLITE CORPORATION

CANADA: Petreco, 4528 Stanley Drive, Calgary, Alberta
ENGLAND: Petrolite Limited, Heathcoat House, 20, Savile Row, London W. 1
VENEZUELA: South American Petrolite Corporation, Hotel Avila, Caracas

PETRECO DIVISION

3202 South Wayside Drive, (P. O. Box 2546), Houston 1, Texas

1390 East Burnett Street (P. O. Box 7216), Long Beach 7, California

Representatives also in Brazil, Italy, Japan, Kuwait, Mexico, Netherlands and Trinidad

Check 3352 opposite last page.

chutes. Because of its smoother surface, more of the finish is in contact with the surface of the chute. As a result, there is more resistance, slowing slide of bag. With slower slide, there is less impact if bags should bump into each other — and therefore less tearing and breakage.

Manufacturer emphasizes that the strength of the paper has in no way been sacrificed. Material meets all government specifications and has low porosity of 10 seconds maximum. The stock does not attract lint or dirt.

(Gripper-kraft stock is product of Hollingsworth & Whitney Division, Scott Paper Company, Chester, Pa.)

Check 3353 opposite last page.

Intruders, fire announced upon night entering of warehouses

Monitor control also permits remote access guard

Sentinel system, used by Standard Pressed Steel Co., Jenkintown, Pa., monitors three warehouse buildings for

Guard may control access to warehouses eight miles away through control console

fire and intrusion. Also, it permits remote control of access to facility during off-hours.

Monitors for fire and forced entry are wired via phone company lines back into console control panel at main guard post. Fire or intrusion is announced by alarm and meter needle on control panel, which indicates which of three buildings is affected.

(Sentinel system is operated by Pinkerton's National Detective Agency, Inc.)

HIGH EFFICIENCY

DUCLONES®

assure maximum recovery at lowest cost

DUCLONES–Ducon high efficiency cyclones–are designed and constructed for high recovery efficiency and low gas resistance. Their sturdy construction assures long, continuous service with a minimum of maintenance.

The exceptional performance of Duclone collectors is the result of these 6 unique features:

1. **Small Diameter produces high efficiency**
2. **Helical Roof provides a turbulence-free path for the entering gas stream**
3. **Steep Cone improves dust separation**
4. **Dust Trap assures efficient dust removal from the cone**
5. **Vortex Shield prevents re-entrainment of dust in upward gas vortex**
6. **Scroll Outlet provides a low resistance clean gas outlet**

send for Bulletin C-958.

the name in DUst CONtrol

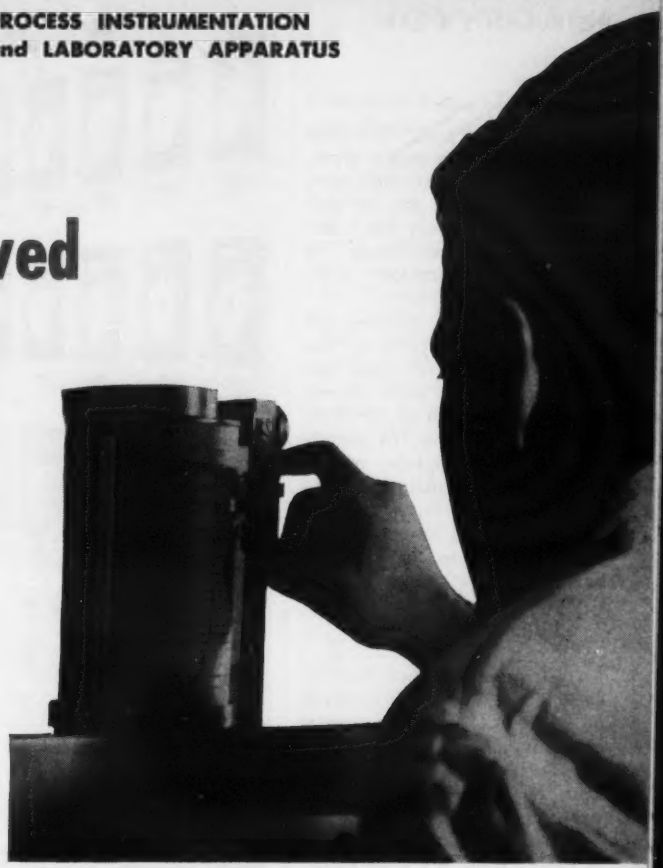
THE Ducon COMPANY, INC.

147 EAST SECOND STREET • MINEOLA, L. I., NEW YORK

Check 3354 opposite last page.

Plasticizer-analysis Time Halved By Infrared Spectrophotometer

. . . which operates normally in laboratory atmosphere



Instrument operates normally in laboratory atmosphere. No difficulty has arisen as result of high humidity or solvent fumes

PROBLEM: Qualitative and quantitative analysis of plastic products was a time-consuming and unreliable operation at the Chemical Testing Laboratory of Celanese Corporation of America in Newark, New Jersey. Plasticizer and additive-type information was obtained by determination of physical constants and chemical-testing methods.

Accurate analysis is essential to maintain necessary quality control of formulations in production of molding powders, film, sheeting, and similar products. Since such products generally contain more than one plasticizer, time and accuracy problems are usually compounded.

Solution: A double-beam infrared spectrophotometer was incorporated into test procedure to save time and produce results of greater reliability.

In testing operation, control laboratory receives "grab" samples of formulations from quality-control department, during intermediate processing.

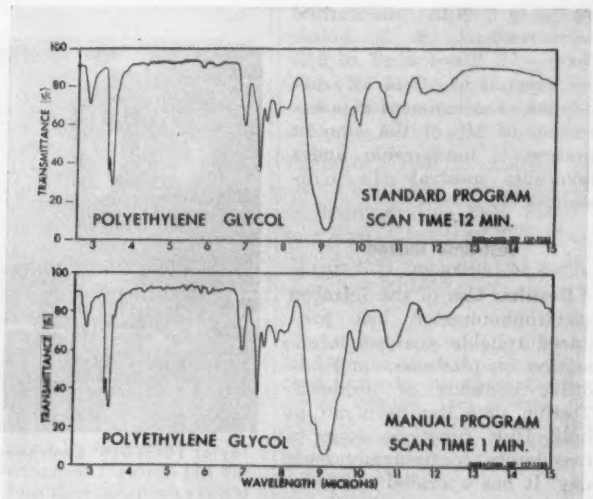
Prior to infrared analysis, cellulose-derivative flake is separated from test sample by the "wet" method of analysis. This is necessary because derivatives produce absorption peaks which overlap those of plasticizers and additives.

Double-beam principle permits meeting of requirements of instrument reproducibility, differential spectra, and data free of atmospheric absorption. Reproducibility is not only from same instrument, but also from instrument to instrument, so that results may be directly interchangeable in laboratory using many units.

Spectrum may be scanned in 12 minutes, with resolution of approximately 0.05μ throughout. Signal-to-noise ratio is better than 100. Scanning is programmed for maximum efficiency (constant time interval per spectral slit width). *To next page*

Double-beam infrared spectrophotometer requires 28 x 17" of bench space and 60-cy 117v power. Source is at right, and two beams (3½" apart) are carried through 10-cm long, open-sampling space. Controls are on left.

Monochromator is in rear, while printed circuit amplifier and power supply are at left and rear. Sample space is covered by tray which is removable for cleaning. Spectrum is recorded on removable drum shown above instrument. Chart paper is standard punched type, measuring 8½ x 11". Spectrum from 2.5 to 15μ is presented with ordinate of 100 mm and abscissa of 250 mm (20 mm to micron).



FAST MANUAL SCANNING — Upper spectrum is normal 12-minute scan of polyethylene glycol. Lower spectrum was obtained in one minute by steady manual rotation of recording drum. Although lower spectrum shows appreciable deviation from first, due to lack of operator steadiness and failure of pen to reach true equilibrium value on strong absorptions, it is adequate for fast simple answers.

From preceding page

Wavelength and slit cams and drum are on single shaft, thus precluding misalignment. Recording papers are on linear λ or non-linear cm^{-1} abscissa vs transmittance or non-linear absorption ordinate.

All non-planar mirrors are necessarily aspheric. The NaCl prism has 70° apex angle, 55-mm high with 75-mm base. Focal length of parabola is 200 mm, giving f/5 monochromator. Complete monochromator and detector system is covered internally by tight desiccated housing, having one window in common beam before entrance slit.

Instrument Performance

Accuracy tolerance specification is $\pm 0.03\mu$. Time study of abscissa stability using sharp bands of isobutane under normal laboratory conditions has shown reproducibility of $\pm 0.025\mu$.

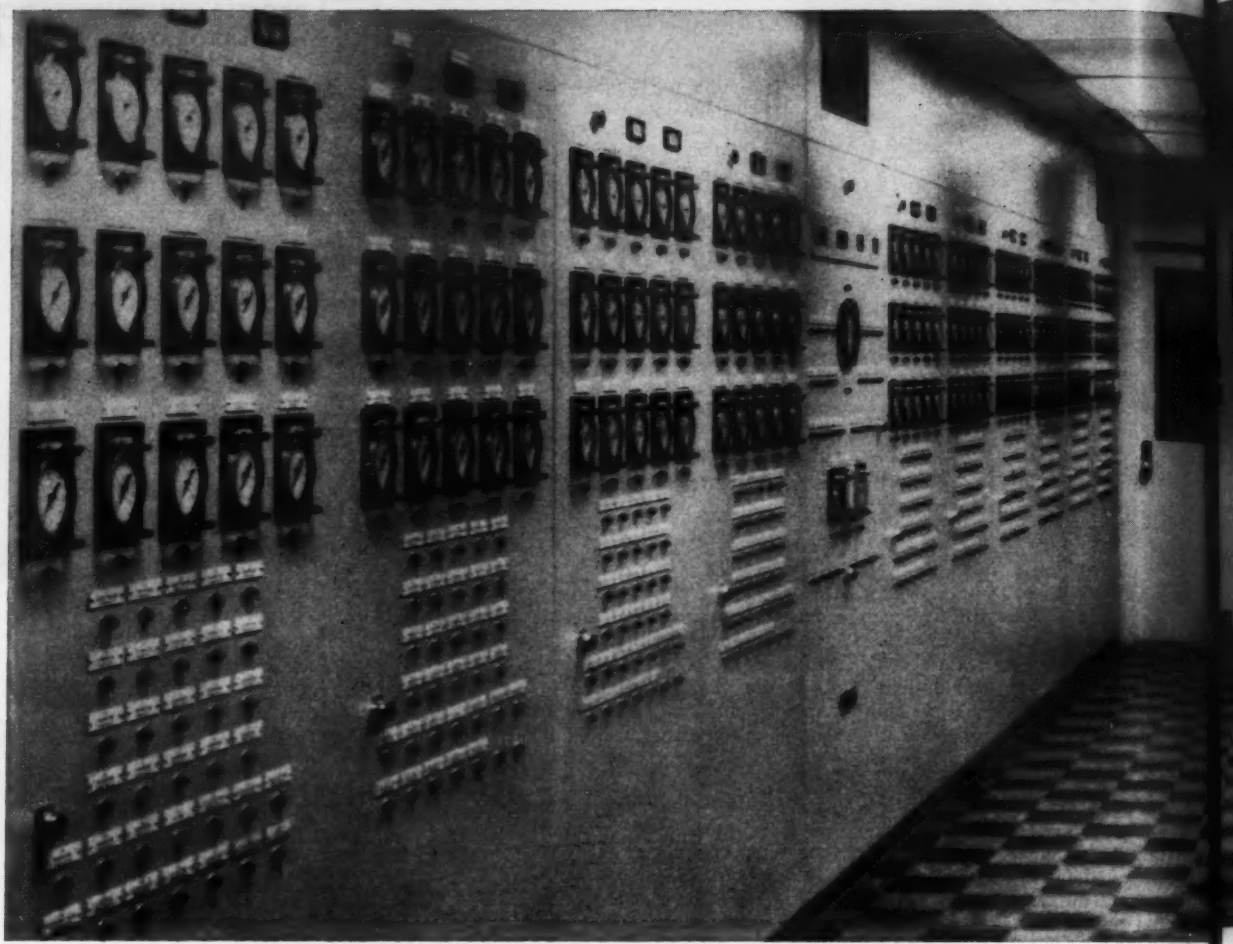
Linearity of optical wedge is better than ±1% in transmittance range from 3 to 100. Average value of two repeated transmittance measurements under high signal-to-noise ratio is reproducible to ±½. With differential measurements, it is better than ±¼. Since a ΔT of 0.35 corresponds to ΔC of 1%, difference of component concentration of 1% of the amount present is measurable under favorable spectral circumstances.

Test-time Halved

Results: Use of the infrared spectrophotometer has produced reliable analysis information on plasticizer and additive contents of products. Testing time has been cut in half. Unit functions four to five hours continuously each day. It has operated normally in laboratory atmosphere, with no difficulty arising as result of high humidity or solvent fumes.

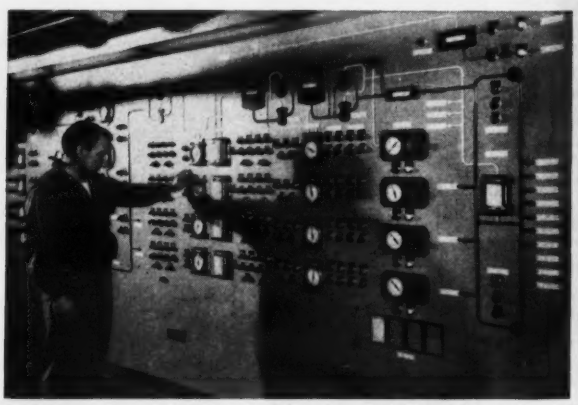
(Infracord spectrophotometer 137 is product of Perkin-Elmer Corporation, Norwalk, Connecticut.)

Check 3355 opposite last page.



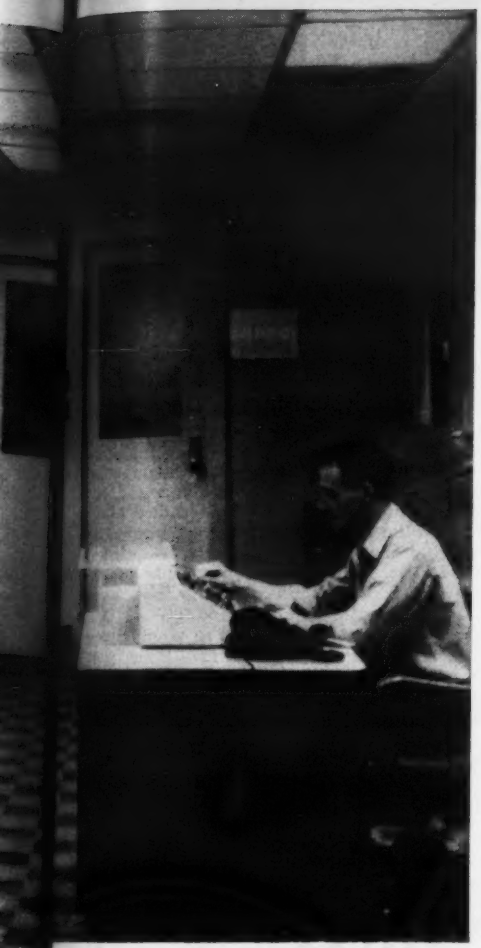
Central control room which provides indicated and printed evaluation of casting machine operations by means of Talyor TRANS-SCAN-LOG system. Typewriters under plastic covers behind operator.

Taylor FULSCOPE* Controllers maintain correct temperature in the wet churns. They receive signals from TRANSAIRE* Transmitters equipped with flat bulbs installed flush with the inside of the churn walls.



One man oversees the viscose filtration and deaeration process from this master Graphic Panel. Taylor miniature indicating and recording instruments enable the operator to quickly pinpoint any abnormal conditions.

Taylor Instruments



Men, machines and Taylor Instruments join forces to produce superior AVISCO cellophane

American Viscose Corporation selected Taylor to furnish the bulk of the instrumentation for the new cellophane plant at Marcus Hook for two main reasons—Taylor's close association with the cellulose industry, and confidence on the part of American Viscose in Taylor Instrument Companies and its products developed over many years.

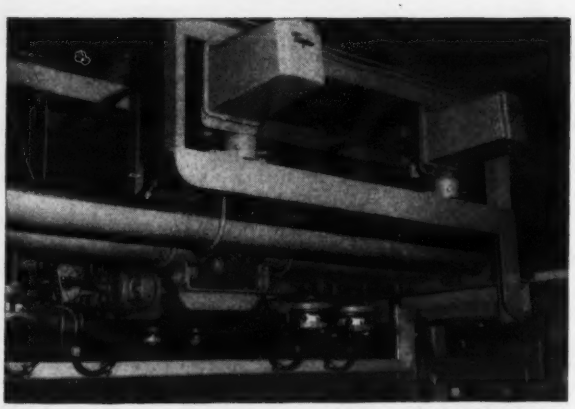
Designed for a capacity of 50,000,000 lbs. of cellophane per year, this plant is among the most modern of its type in the world. Wherever practicable, continuous processing has taken the place of batch operations, necessitating extensive use of automatic control of important process variables at almost every stage.

Photograph at left shows the control center for the important casting area—the largest and most precise control system of its type in any industrial plant, outside of the atomic energy field. Here the Taylor TRANS-SCAN-LOG* system enables one operator to monitor and supervise the overall operation of this stage of the process. Signal lights show at a glance abnormal conditions anywhere in the process. At hourly intervals—or on demand—a typewritten record of all variables is automatically prepared (typewriters shown behind operator). In addition, the operator may select a specific variable, or group of variables, for reading at any time. This system permits operation within closer tolerances than could possibly be obtained with conventional instrumentation.

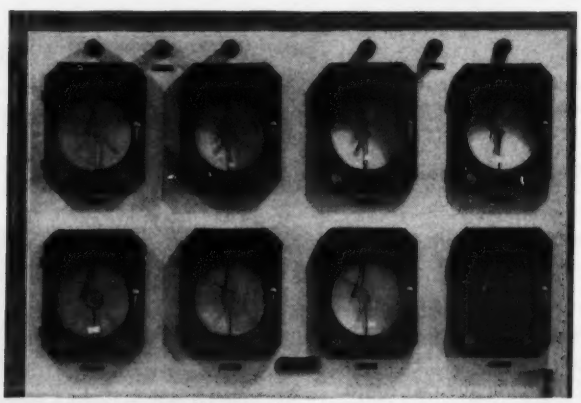
The result, American Viscose tells us, is better, more continuous production and higher quality product.

A Taylor control system may be the answer to your product quality problems—and cut your operating costs too. Why not call in your Taylor Field Engineer, or write Taylor Instrument Companies, Rochester, N. Y., or Toronto, Ontario.

*Reg. U.S. Pat. Off.



Acid flow measurement is accomplished with Taylor 205T Volumetric DP Transmitters, connected to the process by filled capillary systems and diaphragm seals of Hastelloy. Signal is transmitted to the data logging system.



Master control panel for one of the coating towers. Instruments regulate supply of lacquer to the coater, flow and pressure of air for drying, and temperature and humidity conditions within the tower.

VISION • INGENUITY • DEPENDABILITY

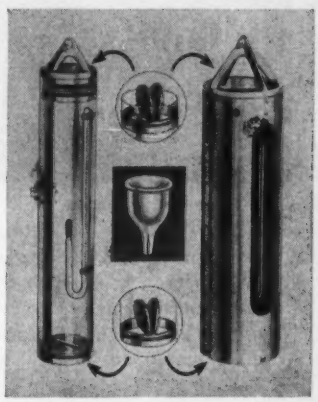
MEAN ACCURACY FIRST

Check 3356 opposite last page.

Sampling bob collects undisturbed portions

A sampling bob which operates on butterfly-wing-valve principle is reported to permit taking of accurate undisturbed samples from any level of liquids held in storage.

Two ends of cylinder are provided with butterfly wing valves. Top and bottom valves open as bob is lowered into product. When downward motion is stopped, wing valves close automatically, thus trapping in cylinder a sample of material from that level of tank. Bobs are furnished in 1/5-, 1-, 1-½-, and 2-qt sizes.



Butterfly wing valve provides trapping action in sampling bob to obtain samples at any level of tank

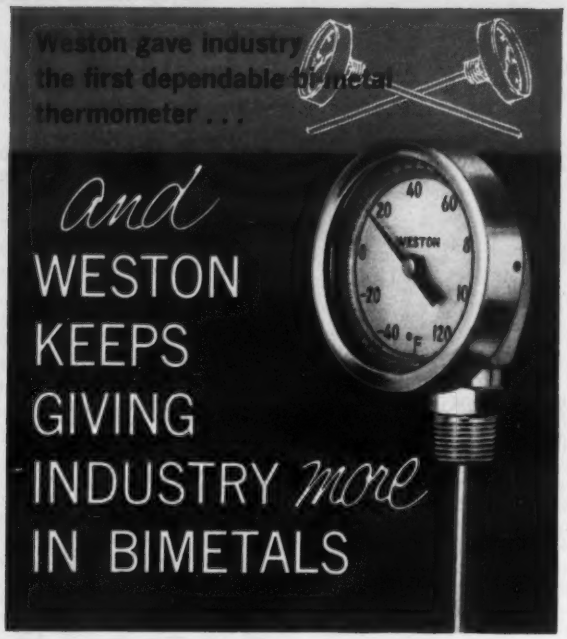
(Sampling bob is product of Oceco Division, The Johnston & Jennings Co., 6917 Bessemer Ave., Cleveland 27, Ohio.)

Check 3357 opposite last page.

Load cells, with output suitable for use with local or remote indicator, recorder or automatic dispenser control, are subjects of Buls 4355 and 4510—Dept. 16-H, Electronics & Instrumentation Division, Baldwin-Lima-Hamilton, Waltham, Mass.

Check 3358 opposite last page.

For more information on developments reported in this section, check corresponding numbers on Reader Service Slip opposite last page of this issue.



Yes, Weston gives you more: the broadest line—from which you can choose thermometers exactly suited to your process . . . more of the features you want – for convenience, readability, accuracy and long service . . . more quality—in the famous Weston tradition of fine craftsmanship.

- **All stainless steel construction, including welds**
- **In-line scales and pointers eliminate parallax errors**
- **External adjustment feature located at side of instrument provided as standard equipment**
- **Removable bezels for easy window replacement in the field**
- **Advanced gasket material to protect against "breathing" and leakage . . . even under extreme outdoor environmental conditions and low temperature measurement service without fogging or freeze-up!**
- **Guaranteed accuracies within 1% of range over entire scale**
- **Full line of sizes, stem lengths and ranges in back and bottom-connected models**

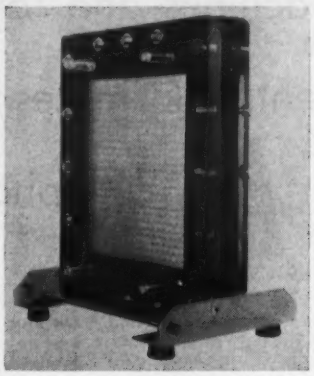
For full information and name of stocking distributor, contact your local Weston representative . . . or write to Daystrom-Weston Sales Division, Newark 12, N. J. *In Canada: Daystrom Ltd., 840 Caledonia Rd., Toronto 19, Ont. Export: Daystrom Int'l., 100 Empire St., Newark 12, N. J.*

WESTON A DAYSTROM UNIT

Bi-metal Thermometers

WORLD LEADER IN MEASUREMENT AND CONTROL

Check 3359 opposite last page.



Laboratory dialyzer

. . . has acid-resistant membranes. Bench unit is inexpensive model that can be used for all types of separation problems involving electrolytes, large organic molecules, and colloidal matter. Unit can handle acid-type as well as alkali and neutral-salt liquors. Made chiefly of plastic, unit measures 20″ high and 15″ wide.

(Laboratory dialyzer is product of Graver Water Conditioning Co., 216 West 14th St., New York 11, N.Y.)

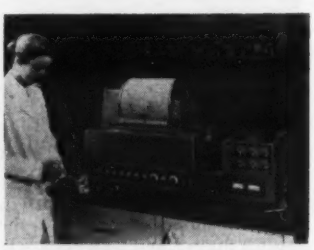
Check 3360 opposite last page.

Infrared spectrophotometer gain-control system is automatic

Uses: Qualitative and quantitive measurement of organic compounds.

Features: Automatic gain control insures active pen under energy conditions by adjusting amplifier gain in accordance with reference-beam-radiation intensity.

Programmed scanning speed



Double-beam automatic-recording infrared spectrophotometer incorporates ordinate scale expansion

Not expensive...but a simple, automatic way to safeguard your investment in heating equipment and materials in process.

The precision-built Pyrotac constantly indicates temperature of the heated equipment and sounds an alarm and/or shuts down the equipment at a safe, preset temperature. May also be used as a controller on processes where shutdown is required upon reaching final process temperature—such as ceramic kilns, molds, etc. Automatic thermocouple break protection assures complete safety if couple or lead wire should break.

Write for Pyrotac bulletin. Attach this ad to your letterhead, send to: Illinois Testing Laboratories, Inc., Room 504, 420 No. LaSalle St., Chicago 10, Ill.

Alnor **PRECISION INSTRUMENTS FOR EVERY INDUSTRY**

Check 3361 opposite last page.

THE *Marion* MIXER

. . . IS STILL THE LEADER

FOR MIXING:

- Dry and Semi-Wet Chemical Powders
- Agricultural Chemicals
- Materials for the Plastics Industry
- Materials for Chemical Processing Plants
- Sweeping Compounds
- Pharmaceuticals
- Fertilizers

A uniform mix is assured time after time, no matter how complicated the formula, and with laboratory exactness. If the formula is right —the MARION MIXER will mix it with complete accuracy.

THE EXCLUSIVE MARION MIXING and BLENDING ACTION will handle any type of chemical materials and give a top quality mixed product at less cost.

Send Today For Free Descriptive Literature

RAPIDS MACHINERY COMPANY
865 11th Street Marion, Iowa

Check 3362 opposite last page.

provides optimum speed for given resolution program. Ordinate scale thus expands by factors of 5, 10, or 20.

Description: Double-beam automatic-recording infrared spectrophotometer incorporates automatic speed suppression. This attenuates scanning rates in regions of sample absorption, for accurate traversal of absorption peaks.

Spectrophotometer scans spectral range from 1.0 to 15.5 microns with standard NaCl optics. Accuracy is ±0.015 microns. Reproducibility is ±0.005 microns, and resolving power is 0.02 microns at 12 microns.

Instrument is 39 x 16 x 22" with external power supply and amplifier. It operates on 117v, 60-cy AC.

(Model 221 spectrophotometer is product of Instrument Division, Perkin-Elmer Corporation, Norwalk, Conn.)

Check 3363 opposite last page.

Thermocouple conductors shielded from elements by polyvinyl chloride

Need eliminated: pulling single extension wires

Uses: Protection and insulation of thermocouple conductors.

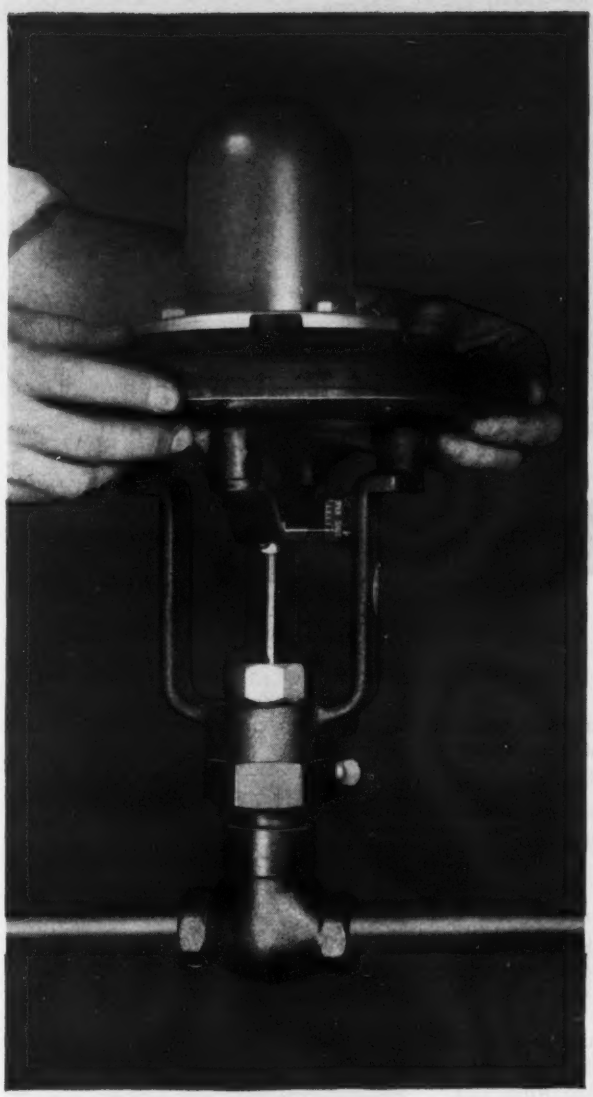
Features: PVC jacket resists moisture, abrasion, heat, and chemical action. Use of cable in conduit eliminates need to pull individual extension wires.

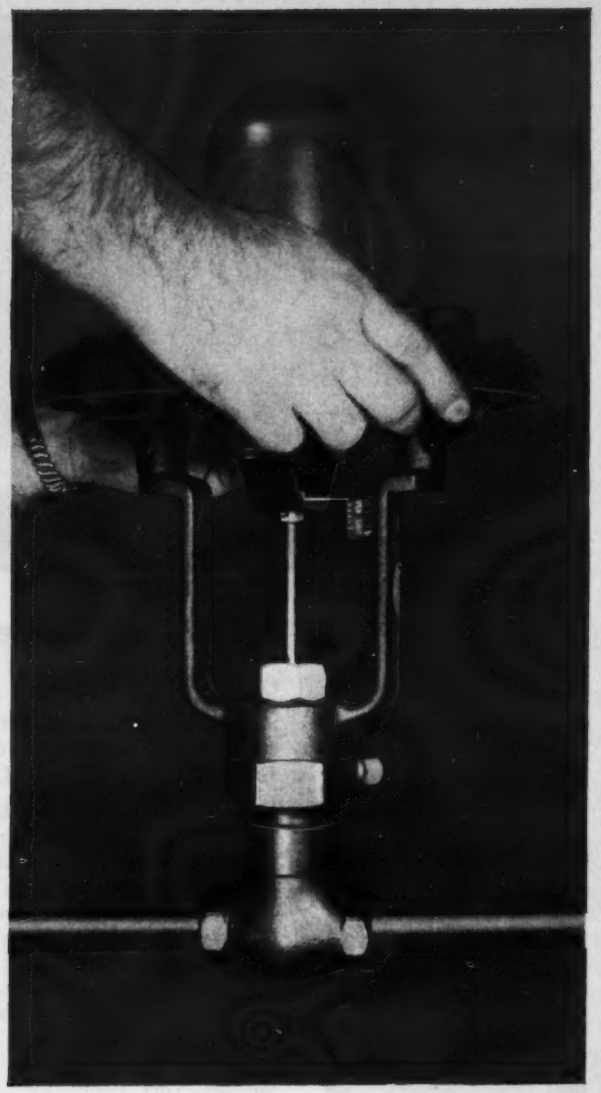
Description: Individual conductors are insulated in high-temperature (221°F) PVC and then concentrically cabled with PVC insulation. Aluminum-backed Mylar tape, wrapped around conductor bundle, provides electrostatic shielding.

Cable is made from either 20 or 16 solid wire or in 17-gauge stranded construction. It is available with either 6, 14, 18, 25, 39, or 56 pairs of thermocouple conductors.

(Thermo-cable is product of Thermo Electric Co., Inc., Saddle Brook, N. J.)

Check 3364 opposite last page.





LOOK HOW EASY IT IS TO REVERSE THE ACTION OF A FOXBORO CONTROL VALVE!

air-to-open . . . air-to-close — one valve for the job of two

Unbolt the motor casing and rotate it 90°; rebolt and shift air connections — that's all you do to reverse the operation of a Foxboro control valve. Takes just a few minutes — without touching valve body or process piping — without employing special tools or skills.

Foxboro reversible motors are especially suited for needle valves, Saunders-type valves, and other control valves having non-reversible bodies. They're also used with Foxboro Stabilflo* Valves — the original valves with equal percentage flow characteristics and wide 50 to 1 rangeability.

Foxboro control valves with their quick-reversible valve motor, are an exclusive Foxboro development. They're perfect for pilot plant operations and other processes frequently "juggled." Types and materials to meet any process requirement.

Write for detailed bulletins today. **The Foxboro Company, 818 Norfolk St., Foxboro, Mass.**

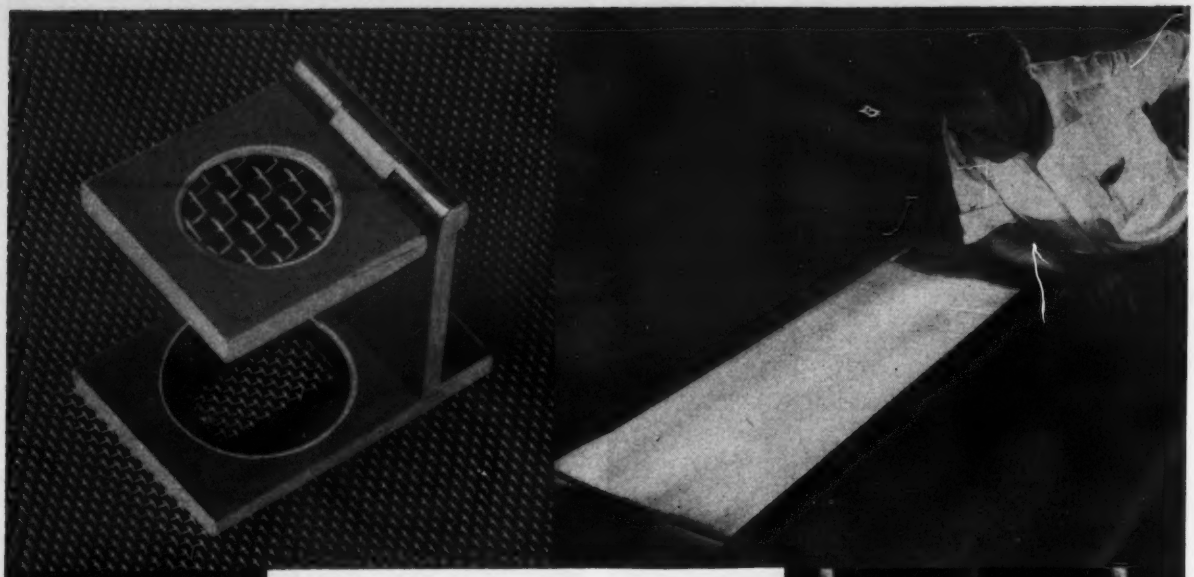
*Reg. U.S. Pat. Off.

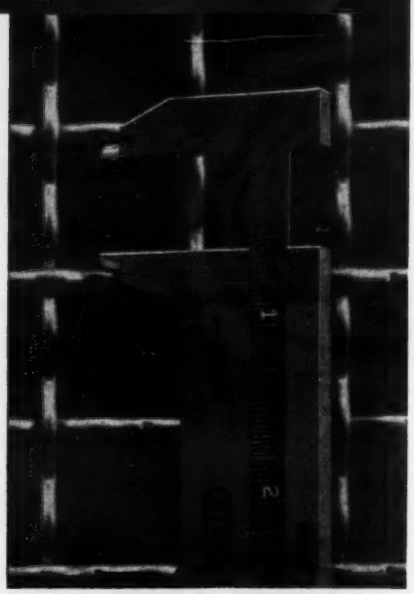
FOXBORO

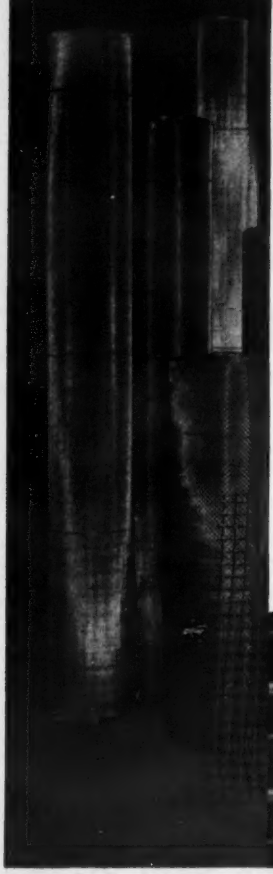
REG. U.S. PAT. OFF.

Foxboro urges you to attend the I.S.A. Show in Chicago, Sept. 21-25

Check 3365 opposite last page.







Who counts 'em?

CAMBRIDGE does . . .

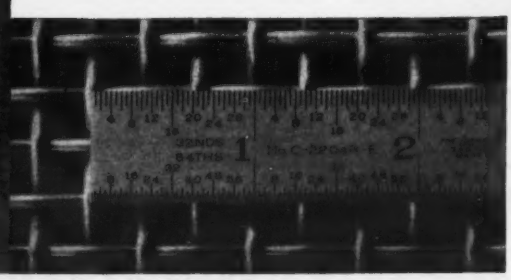
. . . because *exact* mesh count and mesh size are the trademarks of Cambridge INDUSTRIAL WIRE CLOTH.

But, quality isn't the whole story. When you call Cambridge for industrial wire cloth, you also get service . . . prompt answers to your inquiries . . . quicker deliveries . . . and an experienced Field Representative who follows up your order to make sure our product is giving you the best possible service. Let us quote on your wire cloth needs. We manufacture wire cloth from any metal or alloy—including titanium—in nine basic weaves. Very likely, we have what you require in our warehouse right now. For samples or more information, call your Cambridge Field Engineer...he's listed in the yellow pages under "Wire Cloth". Or, write for FREE 94-PAGE CATALOG.

The Cambridge Wire Cloth Co.

Department F ● Cambridge 8, Md.

Manufacturers of Wire Cloth, Metal-Mesh Conveyor Belts, Wire Cloth Fabrications



Check 3366 opposite last page.

Permittivity cells broaden usefulness of universal bridge

Chemical measurements are facilitated

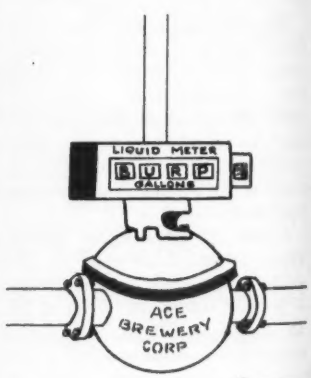
Uses: Chemical measurements to determine: water content of hydrocarbons; contamination of resins and plasticizers; polymerization of resins; and other physical and chemical characteristics which can be detected by changes in dielectric constant.

Features: Special liquid permittivity cells for single sample and continuous monitoring purposes facilitate chemical measurements. Three-terminal facility offered by bridge, together with extreme range and high discrimination, afford high accuracy.

Description: Bridge is designed on transformer ratio arm principle. Discrimination at balance is 0.01% of full-scale reading. Leads of any length may be used without affecting accuracy of measurement. Permittivity cells are available either as sampling cells or as continuous monitoring units.

(Model D 221 universal bridge and type D121 and D221 permittivity cells are supplied by Wayne Kerr Laboratories, 2920 N. 4th St., Philadelphia 33, Pennsylvania.)

Check 3367 opposite last page.



GORDON LARKIN

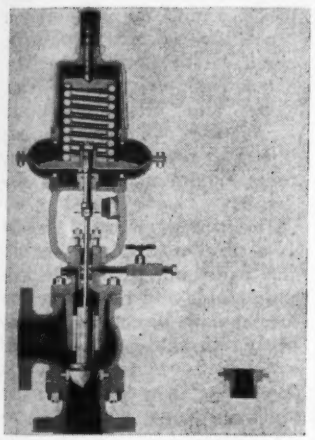
Turbulence is reduced by venturi effect in control valve

Plug stem can be replaced without body removal

Uses: Control-valve applications.

Features: Valve has bolted tailpiece, permitting easy access to clamped-in seat ring. Bolted bonnet permits plug and stem replacement without body removal.

Control valve incorporates a venturi-effect design to reduce



Bolted tailpiece of control valve permits easy access to clamped-in seat ring

turbulence and cavitation in control of slurries.

Description: In angle control valve, pneumatic diaphragm actuator provides air-to-open or air-to-close valve action.

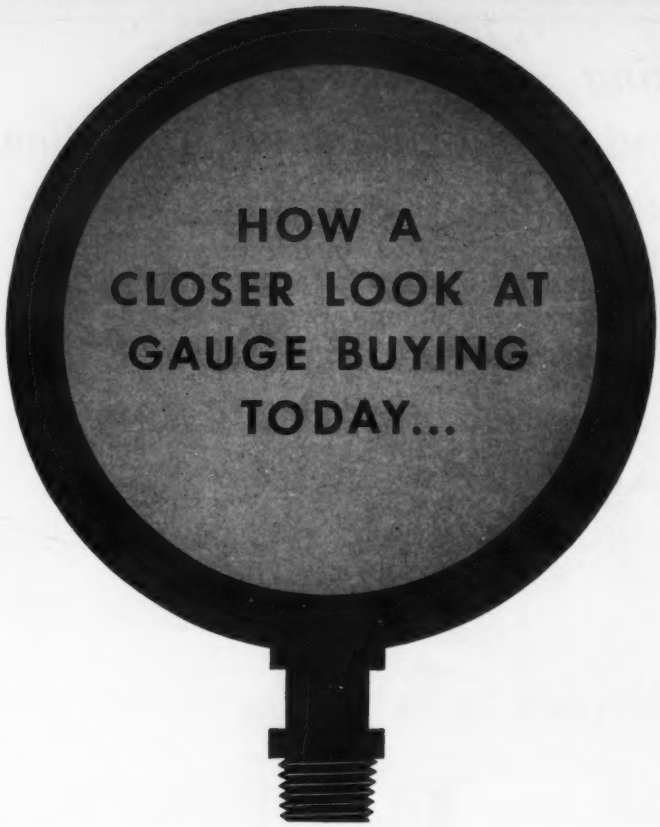
Valves are made of carbon steel and Type-316 stainless steel. They are available in sizes of one through six inches with body ratings to 600 lb. They are available with full capacity or 40% capacity trim.

(Angle control valve is product of Valve Division, Minneapolis-Honeywell Regulator Company, Fort Washington, Pennsylvania.)

Check 3368 opposite last page.

Control, instrument panels are reviewed in 16-page Product Specification G71-7—Bailey Meter Company, 1050 Ivanhoe Rd., Cleveland 10, Ohio.

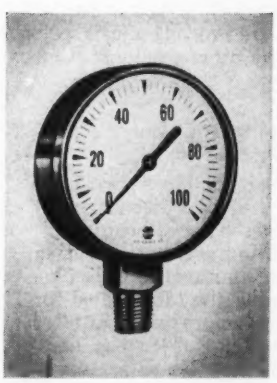
Check 3369 opposite last page.



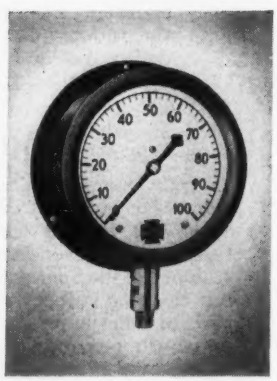
can give you a tighter grip on gauge costs!

Been looking at gauge buying in your plant as "routine"? In terms of gauge performance you need, accuracy you get, price you pay . . . and how and where you buy? You can pick up real savings with a closer look at your gauge requirements . . . and at what United States Gauge offers. USG features the world's largest stock of indicating dial pressure gauges. Over 50,000 standards, plus specials, with all possible choices of sizes, case stylings, pressure ranges and case materials . . . up to and including the finest gauges of highest accuracy. One source meets 99% of your pressure gauge needs, with the exact gauge for the exact purpose at the right price. And one phone call to your USG distributor taps that source. See the Yellow Pages, or write for catalogs and name of your nearest USG distributor today.

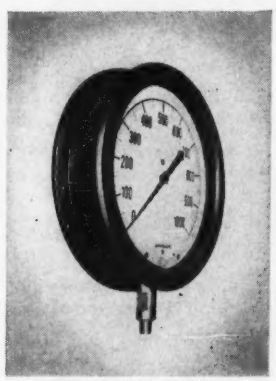
UNITED STATES GAUGE
Division of American Machine and Metals, Inc., Sellersville, Pa.



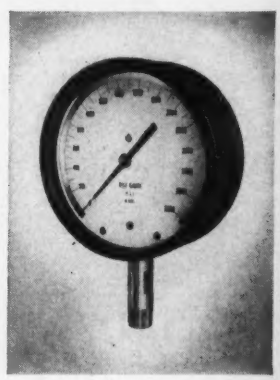
Replacement costs too high? Volume - priced, precision - built USG drawn-case gauges are the money-savers for replacement of any A.S.A. Grade B gauge in your plant (accuracy of 2% guaranteed). These standbys are specified by more than 60% of original equipment manufacturers today. Proof of USG reliability and value! *Write for Catalog 64A.*



Paying a premium for quality design, reliability? Check the new USG A-Line, premium design at savings up to 40% of premium prices! Meets A.S.A. Grade A Standards, including accuracy of 1%. Wide range of cases, sizes, movements, pressures cuts *you* in on A-Line savings wherever you need dependable gauge performance. *Write for Catalog 305.*



Paying for performance you don't get? Look at the USG Supergauge® line. Built like a watch to A.S.A. specifications for Grade AA Test Gauges, these gauges pay for themselves in long-lived, dependable performance and lower maintenance costs. Accurate to 0.5% of scale range. Full selection of case styles, sizes and options. *Write for Catalog 1819.*

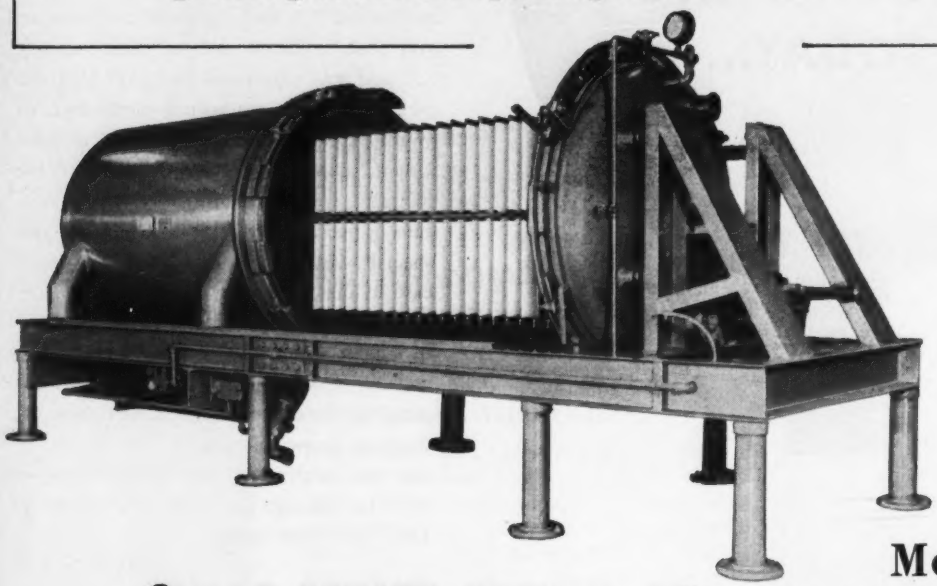


Losing out on highest accuracy? USG Test Gauges are the elite of the industry, equalling or exceeding A.S.A. Grade AA standards with accuracy as high as 0.2 of 1%! Styles, sizes and case materials for all types of laboratory and test uses. You can't buy higher quality and precision in a test gauge! Get your money's worth at USG. *Write for Catalog 400.*

Check 3370 opposite last page.

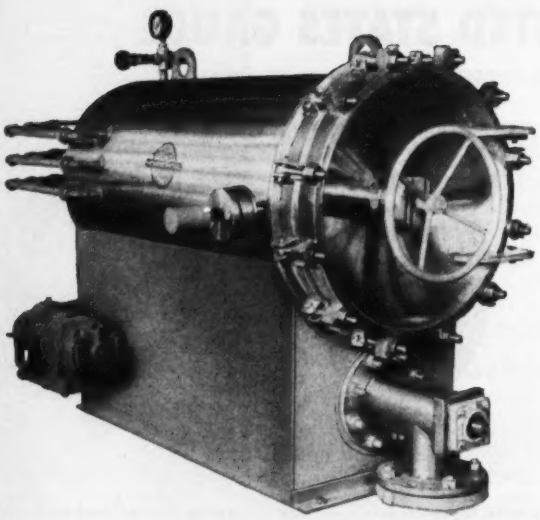
A Filter Man's Thinking is now directed more and more to automatic filtration

Many SPARKLER FILTERS are now available electronically controlled for continuous operation, unattended. Installations of the Model MCR-S and HR filters shown here have opened up an entirely new phase in filtration economy. Write for engineering details and operating records.



Model MCR-S

will handle products with a high percentage of bulky solids and at the same time give a fine quality filtration matched only by the best polishing filters. Installations of this filter are now operating completely automated. Adaptable for the primary filtration of beer, chemicals, petroleum derivatives and many other products. Capacities up to 1000 sq. ft.



Model HR

a revolutionary new filter that combines horizontal plate cake stability with dry cake discharge, all automatic. This filter has all the fine filtering qualities including even precoating and positive cake stability of the Sparkler Horizontal plate filter plus self cleaning without opening the tank. Ideal for toxic or volatile products. This pressure leaf filter for continuous operation has attracted great interest among filtration engineers. Capacities up to 500 sq. ft.

Other Sparkler filters are now available completely automated. Write for recommendations on your filtration problems.

SPARKLER FILTERS

SPARKLER MANUFACTURING CO.
MUNDELEIN, ILLINOIS U. S. A.

Sparkler International Ltd., Manufacturing Plants at Leliegracht 9, Amsterdam, Holland; Toronto, Ontario, Canada; Italy and Australia.

FILTRATION ENGINEERING AND MANUFACTURING EXCLUSIVELY FOR OVER 30 YEARS

Check 3371 opposite last page.

Backwashing reduced in slurry feeding with diaphragm pump

Pumping versatility obtained through combining heads

Uses: Feeding corrosive or non-corrosive slurries or solutions at rates up to 2.5 gph in concentrations to 15%. Units handle such materials as activated carbon, filter aids, clays, acids, alkalis, and salts.

Features: By maintaining a porous body coat, slurry feeders reduce frequency of backwashing compared to filtration by precoat only. Different types of heads may be mounted to permit simultaneous pumping of slurries, acids, and other chemicals. Units with as many as six different heads are available for a maximum pumping versatility.

Description: Slurry feeder is a positive-displacement diaphragm pump. A shaded-pole motor and reduction gear train, both immersed in oil within an acid-alkali-resistant enamelled case reciprocate a synthetic rubber diaphragm. Solenoid valve and timer arrangement automatically provide periodic clear water flushing. Output may be adjusted while feeder is in operation. Maximum working pressure is 125 psi.

(Model 600 series slurry feeder is a product of Precision Chemical Pump Corp., 1396 Main St., Waltham 54, Mass.)

Check 3372 opposite last page.

Magnesium control panels

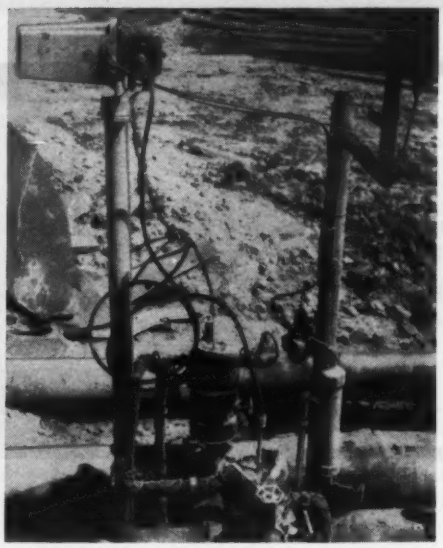
. . . offer advantages of lighter weight, plus savings in time, effort, and cost when instruments are added or boards altered in field.

Blow-torch cutting or welding during alterations is eliminated. Panels can be faced on one or both sides with 1/16" sheet Formica or Mylar as required.

(Magnesium control-panel boards are marketed by Panellit, Inc., 7401 N. Hamlin Ave., Skokie, Ill.)

Check 3373 opposite last page.

Note large amount of steam jacketing, insulation, steam lines, and valves required on former meter



Steam jacket now stops at sensing head connection. With new installation, labor and materials costs are greatly reduced

Pressure transmitter saves on jacketing requirements and maintenance at Freeport Sulphur Co. while providing . . .

Molten-sulfur flow control at lower installed cost

Problem: Control of molten-sulfur flow at Freeport Sulphur Company's mines in Louisiana using an aneroid meter required much integral steam jacketing and insulation. Initial installation, and any changes made later, ran high in labor costs because of care needed to be sure insulation and jacketing maintained a sufficient temperature to keep sulfur molten.

If for any reason sufficient heat was not maintained, sulfur solidified in the meter or leads and costly clean-out was necessary.

Solution: Company recently installed a volumetric differential pressure transmitter to handle molten-sulfur level and flow control. Instrument utilizes force-balance, mercuryless principle in conjunction with a sealed sensing system.

Sensing heads are placed on high- and low-pressure sides of an orifice plate in molten-sulfur line. Pressure differential is transmitted from sensing heads through silicone-fluid-filled, permanently-sealed connecting capillaries to internal primary diaphragm of unit. This causes deflection of primary diaphragm in direct proportion to pressure differential. An opposing force, developed by the secondary portion of instrument, acts on opposite end of a balanced beam. This serves to relay primary measurements to transmitter side for conversion to an output pressure signal.

Results: Since sulfur comes in contact only with diaphragm of sensing head located directly in pipeline, there is no need to insulate leads or meter body. Steam jacketing is not necessary except where normally used on pipeline itself. Fewer valves and steam trace lines are necessary. Entire installation is more economical.

In addition, since molten sulfur does not enter any portion of instrument, chances of corrosion, clean-out, and other maintenance problems are reduced.

(Volumetric differential pressure transmitter 205T is supplied by Taylor Instrument Companies, Rochester 1, N.Y.)

Check 3374 opposite last page.

As SIMPLE and
Dependable
as the Pull of a
MAGNET!
A sleeve, raised and lowered within a non-magnetic tube, attracts or releases an Alnico magnet attached to a mercury switch. Basically, this is Magnetrol.
MAGNETROL
The Simplest, Most Versatile
LIQUID LEVEL CONTROL
Ever Devised!

Linked to liquid level by infallible magnetic force, Magnetrol is free from the limitations inherent in mechanical or electrical controls. With the actuating magnet rated at 98% of initial strength after 30 years, Magnetrol has *infinite operating life,* with practically no maintenance at all. There are no wearing parts to get out of order.

What's more, Magnetrol's simple operating principle permits easy, economical modification of standard units to meet *any* pressure, temperature or corrosion requirements. That's why there's practically no limit to Magnetrol's use. It's also why "specials" are likely to be standard with us. Magnetrol units control level changes from .0025-in. to 150-ft. —with single or multi-stage switching.

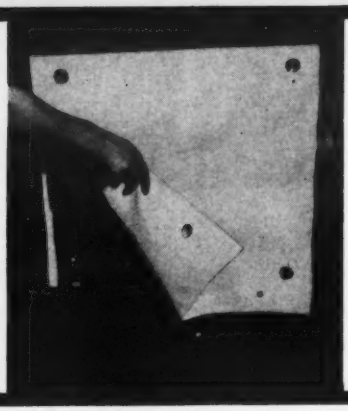
MAGNETROL, Inc.

SEND COUPON FOR DETAILS

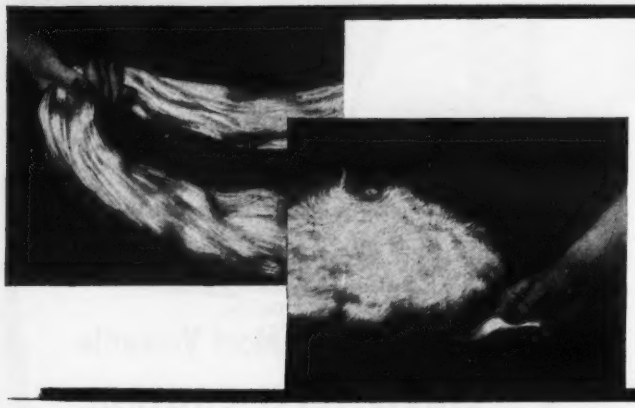
MAGNETROL, Inc. 2129 S. Marshall Blvd., Chicago 23, Illinois
Please send me catalog data and full information on Magnetrol Liquid Level Controls.
Name _____
Company _____
Address _____
City _____ Zone _____ State _____

Check 3375 opposite last page.

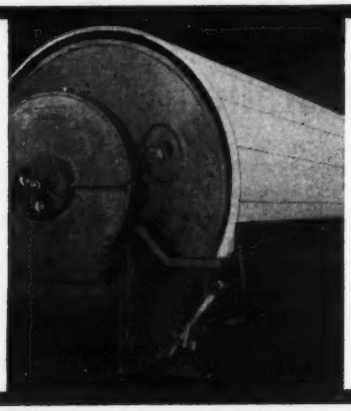
FILTER FABRIC QUIZ



1. Where cloth must be pierced to accommodate the fittings on certain filter presses, care must be taken that the cloth will still fit the fixture, after use. In this regard, pre-shrinking is to cotton fabrics what_____ _____is to synthetic cloths.



2. True or false: characteristics of synthetic fabrics are practically the same whether they are made from staple or filament fibers.



3. True or false: vacuum drum filters can generally use lighter weight fabrics than pressure filters.

Knowing where to get the information and help you need, when you need it, is lots easier than trying to be both a processing engineer *and* a textile technician. Wellington Sears people and the filter specialists who distribute our fabrics are always ready to help with your filter cloth problems. Call us, and for some more handy information, write Dept. M-8 for our "Filter Fabric Facts."

Turn page upside down for answers:

3. true
2. false
1. heat-setting

WEST POINT TEXTILES

WELLINGTON SEARS *FIRST In Fabrics For Industry*

Wellington Sears Co., 111 West 40th Street, N. Y. 18, N. Y. Atlanta • Boston • Chicago • Dallas • Detroit • Los Angeles • Philadelphia • San Francisco • St. Louis

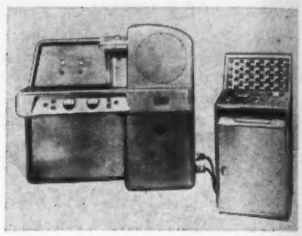
Check 3376 opposite last page.

Completely automatic spectrography

Uses: Automatic spectrography.

Features: Unit is completely automatic throughout range of 81 elements in atomic scale from magnesium to uranium.

Description: Multi-indexing X-ray spectrograph incorporates universal detector and automatic crystal changer. Detector consists of combination flow proportional counter and scintillation counter wired for automatic operation. Dual detector power supply is included. Operator may select either flow counter alone or scintillation and flow counter combination, as needed.



Multi-indexing X-ray spectrograph provides completely automatic operation throughout range of 81 elements in atomic scale from magnesium to uranium

Crystal changer includes three crystals mounted in goniometer, which is rayproofed and completely enclosed. Crystal programming is preset. Operator may manually select any crystal for any channel, whenever automatic programming is not desired.

(Norelco Autrometer is product of Instruments Division, Phillips Electronics, Inc., 750 S. Fulton Ave., Mt. Vernon, New York.)

Check 3377 opposite last page.

Color code eases setting of control valve

Uses: Control valve regulates flow of gases and liquids.

Features: Adjusting scale is coded with easy-to-read color graduations.

Description: Each full turn of screw exposes another color. Also, the screw is gradu-

ated numerically so that valve can be set on Red 5, Blue 6, etc. Color coding simplifies problem of presetting valve and eliminates errors accruing from method of counting the number of times a screw must be turned to set or reset a valve.

Other features incorporated in coded valve include: guided poppet stem which eliminates poppet "cocking" and insures accurate seating; positive needle stop that prevents needle from being backed completely out; poppet stop to prevent spring damage; and locking set screw to eliminate tampering by unauthorized personnel.

Available in ⅛", ¼", ⅜", ½", and ¾", standard models withstand pressures up to 5000 psi. Internal and moving parts are constructed of stainless steel. Bodies are available in brass, carbon or stainless steel.

(Colorflow valves are manufactured by The Manatrol Corporation, 2108 Payne Ave., Cleveland 11, Ohio.)

Check 3378 opposite last page.

Chromatographic analysis completed in 3 minutes

Uses: Computation of gas-chromatographic anaylsis.

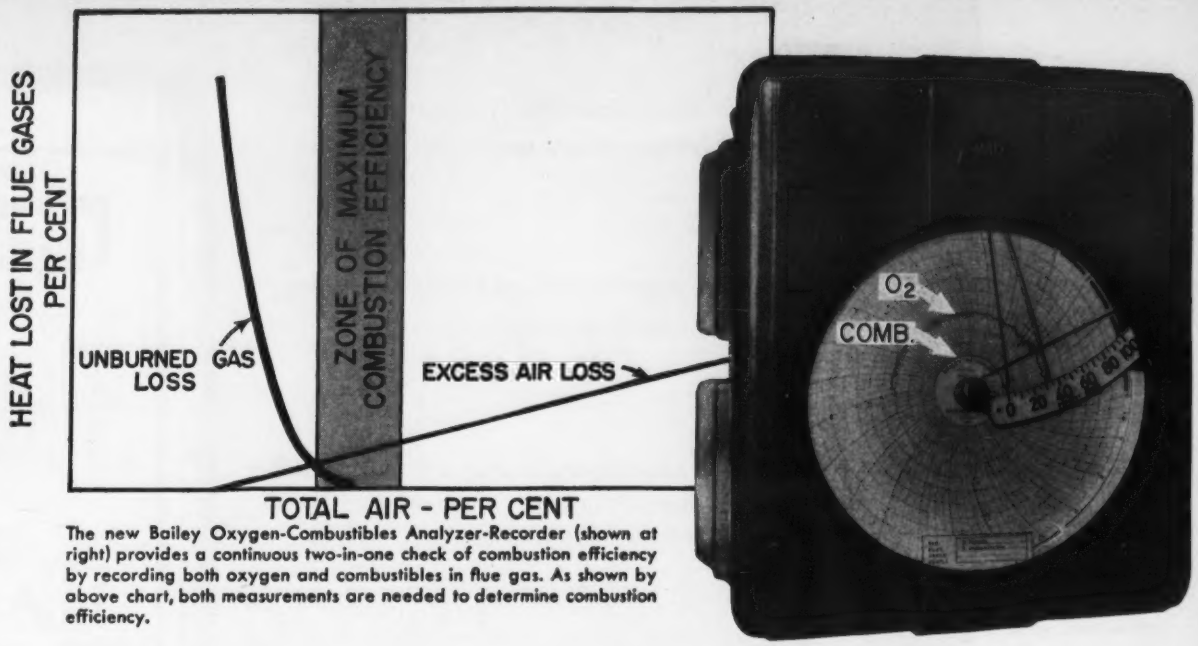
Features: Computer permits calculations of complete analysis in less than three minutes. Calculated percentages are accurate to within ± 0.1%.

Description: Analog computer corrects peak areas or peak heights for differences in responsive detectors. It normalizes corrected areas or heights to total 100. This gives percent (mole or weight, according to correction factors inserted) of each individual component.

Units are available in models for four components or less (4075-4), eight component (4075-8) or 12 components (4075-12).

(Computagrams 4075-4, 4075-8 and 4075-12 are products of Podbielniak, Inc., 341 E. Ohio St., Chicago 11, Ill.)

Check 3379 opposite last page.



The new Bailey Oxygen-Combustibles Analyzer-Recorder (shown at right) provides a continuous two-in-one check of combustion efficiency by recording both oxygen and combustibles in flue gas. As shown by above chart, both measurements are needed to determine combustion efficiency.

BAILEY announces . . .
New 2 in 1 way to measure Heater Combustion Efficiency

The new Bailey Oxygen-Combustibles Analyzer-Recorder gives you a continuing double check on combustion economy. It's fast response measures and records:

1. Excess air—regardless of the fuel or combinations of fuels being burned.

2. The mixing efficiency of your fuel-burning equipment—by indicating the amount of combustibles in your flue gas, resulting from incomplete mixing of fuel and air.

Combustion efficiency depends upon fuel-air ratio. Too much fuel can be even more costly than too much air. And because of the interdependence of these two factors, no control that measures only one of them can give you complete protection.

Now, for the first time, you can check *both* with a *single* fast acting instrument, using the new Bailey Oxygen-Combustibles Analyzer-Recorder for industrial furnaces, kilns, heaters and boilers.

Fuel economy improves as excess air is reduced —until unburned fuel begins to show up in the flue gas. When this happens, combustion efficiency drops off sharply if there are further decreases in the air-fuel ratio. That's why combustion gases must be analyzed for *both* oxygen and combustibles to get a true indication of efficiency—and that is why Bailey coordinates both measurements on the same chart, to show when excess air may be reduced safely without danger of greater losses from unburned gases.

The Bailey Oxygen-Combustibles Analyzer is an approved combustion safeguard.

Ask your local Bailey engineer for suggestions on application. Equipment details in Product Specifications E65-1 and E12-5. C7107-1

Chemical and petroleum division

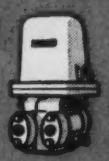
BAILEY METER COMPANY

1074 IVANHOE ROAD • CLEVELAND 10, OHIO

In Canada—Bailey Meter Company Limited, Montreal

Check 3380 opposite last page.

Indicating Motion-Type Transmitters
... for flow, pressure, and level

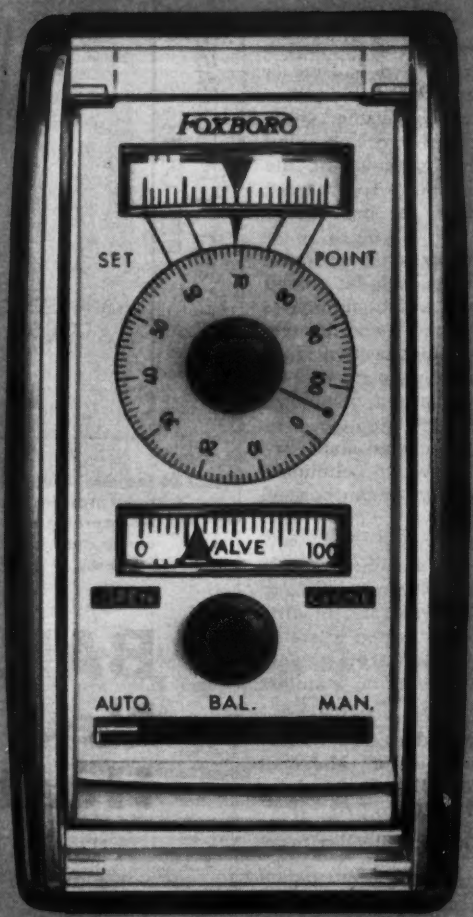


Low Displacement Force-Balance Transmitters
...for flow, pressure, and level

Thermocouple and Resistance Bulb Converters
... magnetic amplifiers... no vibrators
... no mechanical rebalancing

Displacer Level Transmitters
...force-balance for simplicity

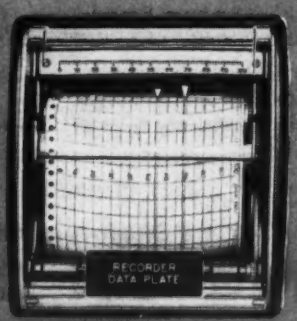
Control Valves
... electro-pneumatic and electro-hydraulic actuators



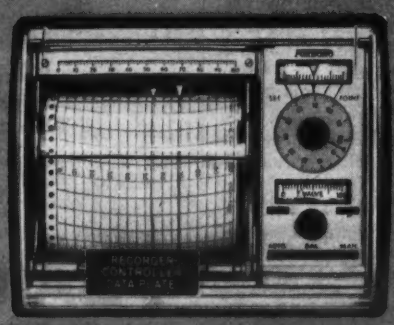
CONTROLLER
The Electronic Consotrol Controller (shown 4/5 actual size) concentrates all control and supervisory functions in one slim 3 x 6 inch case. Controller operation is entirely independent of recorder.

FOXBORO Electronic

REG. U.S. PAT. OFF.



RECORDER
Electronic Consotrol Recorders (shown ¼ actual size) use a simple, powerful pen motor which can be operated directly from transmitter signal without amplification. Available in 1 and 2 pen models.



COMBINED RECORDER-CONTROLLER
Electronic Consotrol housing design permits unequalled flexibility in panel arrangement. Recorders and controllers can be mounted separately in individual housings—or enclosed in a compound unit. Regardless of mounting, either unit pulls out independently.

for the first time... the 100% solid state electronic system!

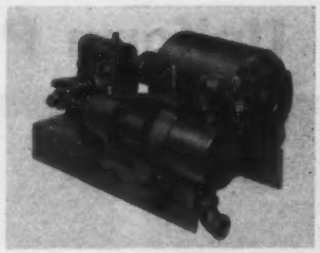
- thermocouple and resistance bulb converters-using magnetic amplifiers
- choice of force-balance and motion-type transmitters
- long time-constant tubeless controllers

Consotrol Instrumentation

Electronic Consotrol* Instrumentation—the most complete and advanced family of electronic-operated measurement and control instruments available today! That just begins to describe Foxboro's dramatic new advance in instrumentation. ✓ ✓ ✓ Foxboro electronic transmitters, indicators, recorders, control stations, computing stations, valve actuators and other final operators cover every function in the control loop. All are linked by a d-c current signal. All are completely tubeless. Even thermocouple and resistance-type systems no longer require vacuum tubes. ✓ ✓ ✓ Electronic Consotrol systems convert temperature, pressure, flow, level, and other measurements, to a proportional signal **at the transmitter.** Transmission to a remote control station is instantaneous. Designs are available for both hazardous and non-hazardous areas. ✓ ✓ ✓ Electronic Consotrol Instrumentation heralds a whole new era in process control engineering. Write Foxboro today for the new 32-page Catalog 21-10 which gives full details. **The Foxboro Company, 818 Neponset Ave., Foxboro, Mass., U.S.A.**

*Reg. U.S. Pat. Off.

Check 3381 opposite last page.



Screwed gland packing extends versatility of metering pump

Up to 28 gph, 1100 psi handled by simplex unit

Uses: Metering clear and corrosive liquids to chemical processes.

Features: Screwed gland packing affords application flexibility and choice of materials of construction.

Description: Delivers maximum capacities to 28 gph in simplex designs and double that in duplex models (two liquid ends with common motor and base). Handles up to 1100 psi.

(Model CM chemical-metering controlled-volume pump is product of Milton Roy Company, 1300 E. Mermaid Lane, Philadelphia 18, Pa.)

Check 3382 opposite last page.

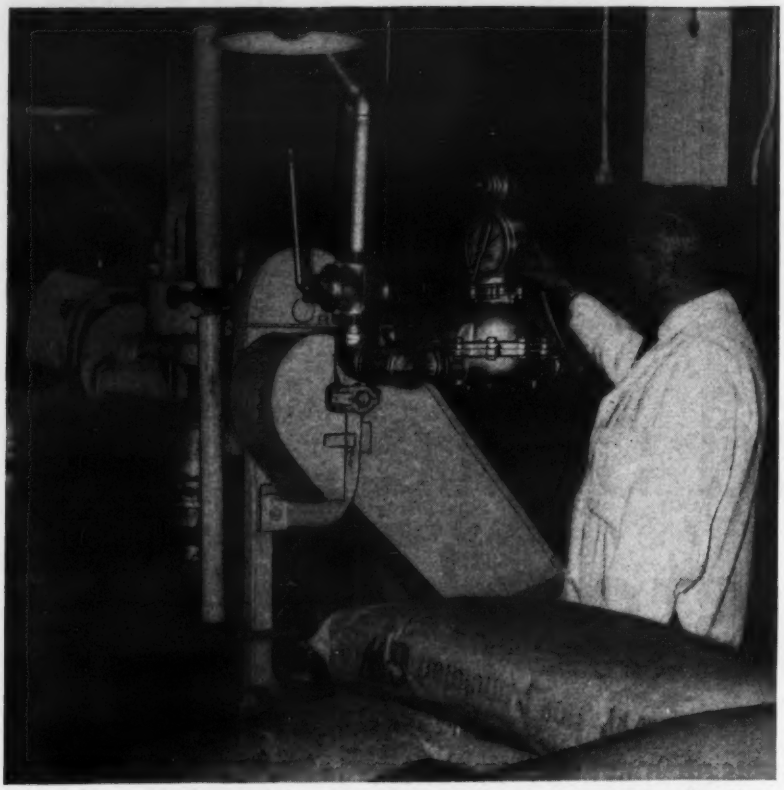
NEXT MONTH

September is instrument month. The Instrument Society of America's Instrument-Automation Conference and Exhibit opens in Chicago and CHEMICAL PROCESSING magazine will present the fifth annual editorial feature on process instrumentation and control.

"What Will Be the Computer's Future Role in Chemical Processing?" To lead off our feature this year, CP's editors asked leaders among instrument, chemical, and computer manufacturers to present their answer to this question. Read their analysis next month.

You'll also want to see the array of articles on solutions to processing control problems, plus highlights of new equipment and literature.

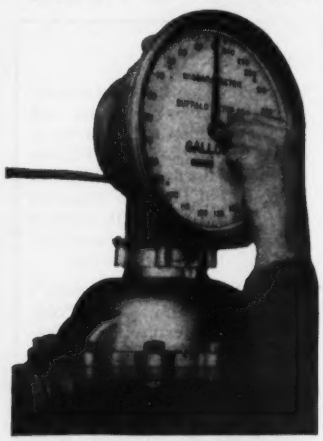
HOW TO INSURE
Uniform Product Quality



Glucose being measured accurately from storage tank to cooking vats in large candy making plant.

Niagara Meters do it Automatically

Set for 175 Gallons



Get 175 Gallons

Consistent high quality in every batch of candy can only be maintained by accurate formulation. That is why this candy company, one of the world's largest, uses Niagara Electricontact Meters to automatically measure the liquid ingredients . . . positive assurance of day by day accuracy that has maintained the enviable reputation and quality of this candy for 15 years.

Whatever your product may be — if measuring of liquids plays a part in its production, you can be sure of consistent quality by the use of Niagara Electricontact Meters. Automatic measurement is a must in today's competitive market. Avail yourself of this cost-saving, time-saving accuracy by automation. Write for complete information.

BUFFALO METER COMPANY, Incorporated

2892 MAIN STREET • BUFFALO 14, NEW YORK

Check 3383 opposite last page.

Use diaphragm head remote from pump for immersions

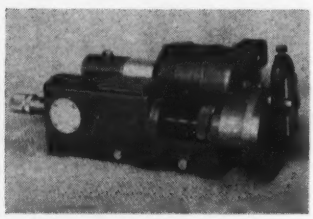
Pumps will accept variety of interchangeable heads

Uses: Pumping applications where conventional glands prove troublesome.

Features: No glands in contact with liquid pumped. Diaphragm head may be used remote from pump where necessary to immerse in constant-temperature bath or for similar application.

Description: Heads are interchangeable, being removed by loosening one socket-head cap screw.

Flow can be varied by micrometer adjustment of stroke



"M" pump (shown) and Micro pump accept interchangeable diaphragm heads

length without interrupting pumping. Micro range of pumps covers capacities from 0-7 to 0-1500 cc/hr, and is suitable for discharge pressures up to 50 psig. "M" range is from 0-0.16 to 0-9.9 gal/hr, and may be used with discharge pressures up to 100 psig.

Suction and delivery ball valves are both duplicated so pumping efficiency is maintained if one fails.

(Micro and "M" pumps are manufactured by Marton Equipment, Inc., 202 Rantoul St., Beverly, Mass.)

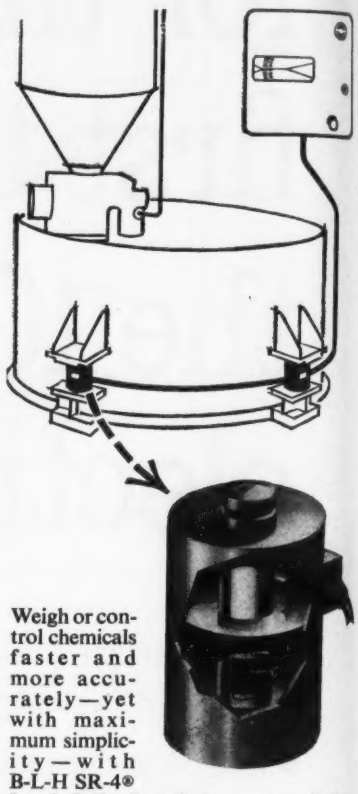
Check 3384 opposite last page.

X-ray spectrographs which accumulate complex analytical data and present it in simplified form are described along with applications, operating principles, performance, and other data in 8-page Norelco Booklet—Instruments Division, Philips Electronics, Inc., 750 S. Fulton Ave., Mt. Vernon, N.Y.

Check 3385 opposite last page.

MEASURING QUANTITY?

Then do it the modern way . . . with accurate, rugged, trouble-free SR-4® Load Cells



Weigh or control chemicals faster and more accurately—yet with maximum simplicity—with B-L-H SR-4® Load Cells. Installed as part of the tank support structure, no part of the measuring system comes in contact with the contents of the tank. Can be installed on tanks already in use. Output suitable for use with local or remote indicator, recorder or automatic dispensing control. Explosion-proof. Hermetically sealed—unaffected by dust, grease or moisture; long service life assured. Available in standard capacities of 50 through 200,000 lb., accuracies to ±0.10%.

For more information on load cells and complete batching systems, write Dept. 16-H and ask for Bulletins 4355 and 4510

FIRST in force measurement

SR-4 BALDWIN BLH LIMA-HAMILTON

BALDWIN·LIMA·HAMILTON

Electronics & Instrumentation Division
Waltham, Mass.

SR-4® Strain Gages • Transducers • Testing Machines

Check 3386 opposite last page.

Polyvinyl tape withstands abrasion from solid rock underground. High insulating value of tape helps protect pipe from electrolysis

Polyvinyl Tape Protects Pipe at Atomic Power Plant

Pressure-sensitive tape is easily applied to tees and elbows in cramped quarters—will stand corrosive and abrasive conditions underground

AT the Dresden nuclear power plant of the Commonwealth Edison Company, 50 miles southwest of Chicago, polyvinyl chloride tape is being used to advantage in protecting underground piping from corrosion. The pressure-sensitive tape was chosen because it could be applied rapidly without heat and would provide the required protection.

At the Dresden Power Station, a network of underground aluminum piping laces the area around the buildings. Wherever possible, pipe precoated with a coal-tar mastic compound was used.

Because some pipe sizes were not available with mill coating and because there were thousands of connections, splices, tees, and elbows in the system — the mastics had to be supplemented by a coating system adaptable to the environment and other conditions.

Engineers of the Bechtel Corporation, construction contractors of the Dresden project, decided to use pressure-sensitive tape for protection of piping not installed precoated. Pressure-sensitive tape was selected because it could be applied rapidly, thus holding labor costs to a minimum—because it required no heating or special equipment that would be awkward to handle in the cramped, multi-level pipe trenches — and because it could be applied under almost any weather conditions. Most important, it offered long-lasting protection.

Polyvinyl tape was used at Dresden because of its excellent resistance to abrasion and penetration. The ground surrounding the reactor-generator is solid rock for the most part, under approximately 12" of topsoil. Soil stress and backfill therefore become important problems. Polyvinyl film resists this physical attack as well as the chemical, electrical and bacteriological conditions encountered underground.

Tape used at Dresden is 3" wide and has a tensile strength of 56 psi, and a stretch factor of 150%. It has a dielectric strength of more than 20,000 volts and an insulation resistance of 100,000 megohms. Tape has extremely low moisture absorption and penetration (slight edge of adhesive at the lap will not wick water). In laboratory tests, this vinyl film rated "excellent" or "good" protection against all corrosive factors present in this installation.

Tape Wrapping

Much of the tape wrapping was done indoors in an area of the unfinished plant set aside for this purpose because extra speed and economy could be achieved in this way. Large sections of pipe were made up and wrapped and then moved to the pipe trenches for connection into the lines.

All pipe holidays, welds and splices were thoroughly cleaned, then brush-coated with primer. A two-man team wrapped the tape by hand using no special equipment. The 3" ribbon of tape was applied with a 1⅝" overlap to provide double thickness throughout. Two-man teams also were used for the outside work. The same basic procedures were followed.

(Plant was designed by General Electric Co., Schenectady 5, New York.)

(Trantex Dutch Brand polyvinyl tape is product of Johns-Manville Corporation, 7800 S. Woodlawn Ave., Chicago 19, Ill.)

Check 3387 opposite last page.

One worker applies tape while another assures proper lapping and smooth application to pipe

NON-FOAMING PUMP

Write for Literature on
ALL-CHEM® PUMP

ECO ENGINEERING COMPANY
[illegible] New York Ave., Newark, N. J.

ECO

the big name in small pumps
for the process industries

Check 3388 opposite last page.

Non-turning plug disc in plug gate valve

Uses: Oil field water-flooding service. Also, wherever corrosion and erosion are problems.

Features: One-inch valve combines advantages of gate

One-inch valve offers combined advantages of gate valve and plug disc globe valve

valve and a plug disc globe valve. It has resistance to corrosion and erosion.

Description: Valve incorporates tapered non-turning plug disc, stem pinned to disc, and hand wheel attached to yoke sleeve. It also has reduced seat and fine stem threads for accurate flow control, O-ring bonnet joint and rating of 1500 psi.

(One-inch gate valve is product of Crane Company, 836 S. Michigan Ave., Chicago 5, Illinois.)

Check 3389 opposite last page.

Laminated plastic made of Teflon in glass cloth

Uses: Corrosive applications such as gaskets and seals.

Features: Laminated plastic resists effects of all chemicals except alkali metals and fluorine halides. Material withstands solvents below 500°F.

Description: Product consists of layer of glass cloth impregnated with Teflon resin and covered on both sides with continuous Teflon resin film. Film gives freedom from pinholes.

Laminated plastic is offered as continuous natural-color, smooth-finish sheet in coils in

"STANDS UP *in the tough applications*"

. . . says still another user

"Delanium" Graphite BLOCK TYPE HEAT EXCHANGERS

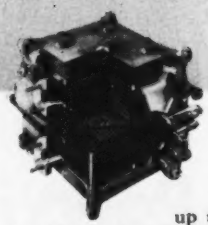
PERFORMANCE REPORT 206

OPERATION: Heating hydrochloric acid from 32° F. to 160° F., using steam at 90 psig.

UNIT: "Delanium" Graphite Block Type Heat Exchanger Model 50/50

PERFORMANCE: Exchanger operating at 10% above design capacity. Occupies only 4 sq. ft. of floor space.

USER: Well known Eastern chemical manufacturer.



The denser grade of graphite in "Delanium" exchangers provides greater resistance to corrosion and mechanical abuse. Block-type design can handle operating pressures up to 200 psig against 40 to 50 psig for most other types of graphite heat exchangers. Occupies 1/3 the space of other units of comparable heat transfer surface. No internal gaskets between process and service streams; no floating heads, no packing. Sixteen models, 4 to 350 sq. ft. Temperatures to 360°F. and higher. Heaters, coolers, evaporators, condensers . . . for pharmaceuticals, agricultural chemicals, acids, organics and chlorinated solvents.

Write today for descriptive bulletin

KEARNEY INDUSTRIES

DELANIUM GRAPHITE DIVISION

P. O. BOX 501 **SO. PLAINFIELD, N. J.**

Check 3390 opposite last page.

need more information . . .

Note there is a key number at the end of editorial articles or advertisements. To request more information circle the proper number on the convenient form opposite the last page. Send the form to us . . . we do the rest. Information comes direct to you. No obligation, of course.

thicknesses of 0.008, 0.007, and 0.009" (standard). Maximum width is 6"; maximum length is 75'. Material can be supplied with one or both sides cementable. Other sizes are available on special order.

(Dilecto GB-108TED is product of Continental-Diamond Fibre Corp., Subs. of The Budd Co., Newark 107, Del.)

Check 3391 opposite last page.

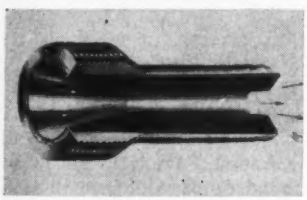
Lining increases life of blast nozzles

Boron-carbide interiors last 750 to 1500 hours

Uses: Blast-cleaning operations with all abrasives, particularly silicon carbide or aluminum oxide.

Features: Long life—up to 750 hours of use with sand, and 1500 hours with shot or grit, according to manufacturer. Nozzle style affords fast cutting, reducing abrasion consumption.

Description: Venturi nozzles have boron-carbide lining. Sizes range from 3/16- to



Abrasive passing through straight section of venturi accelerates and develops outlet speed twice that of straight nozzle

½"-diameter orifices. All have 1¼" pipe threads, and are encased in shock-resistant steel tubing.

(Further information about Norbide-lined venturi nozzles may be obtained from Dept. 3-C, Clementina Ltd., 2277 Jerrold Ave., San Francisco 24, California.)

Check 3392 opposite last page.

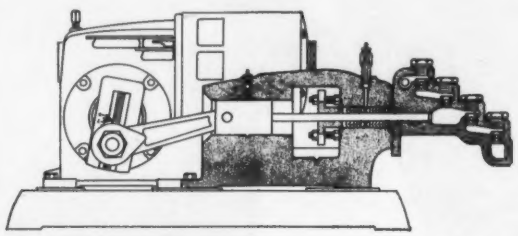
(Norbide — boron carbide — is manufactured by The Norton Company, Bond St., Worcester 6, Mass.)

Check 3393 opposite last page.

HOW TO METER ACIDS ACCURATELY AGAINST PRESSURE

Corrosive liquids present two major obstacles to achieving maximum metering accuracy, economy, and safety. For one thing, corrosion can introduce an intolerable ever-changing volumetric error. For another, corrosive liquids must be retained by the pump at all times. Leakage can endanger personnel and necessitate the premature replacement of pump parts and associated equipment.

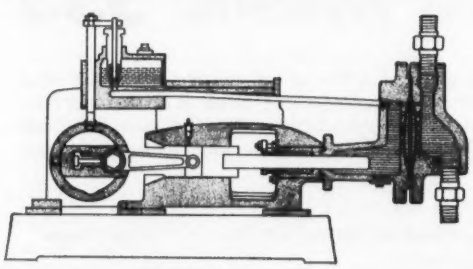
But both obstacles can be successfully overcome. First by choosing the right pump for the metering job at hand. Second, by making sure that all wetted parts of the pump chosen are inert to the liquid being metered. Here are some ideas based on practical acid metering experience that may help you to choose the one best controlled volume pump for your metering needs.



Packed Plunger Pumps

For the majority of mildly corrosive liquids, low cost packed plunger pumps have proved themselves entirely adequate. Some thirteen materials of construction are *standard* on packed plunger pumps, running from cast iron to Hastelloy B and C, more than enough to satisfy mild corrosive metering requirements. Capacities to 2056 gph, pressures up to 50,000 psi.

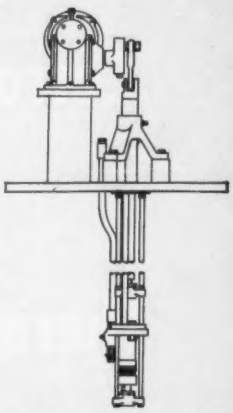
An added tip: Standard Milton Roy motor driven pumps in corrosive service can be equipped with "catch-all" yoke type gland followers.



Diaphragm Liquid Ends

When the liquid to be metered is highly corrosive or otherwise dangerous, a controlled volume pump with diaphragm liquid end is the best choice. A plastic or stainless steel diaphragm positively separates the process liquid and the plunger. The plunger displaces a hydraulic fluid which in turn strokes the diaphragm to create pumping action through the ball checks. Consistently high accuracy is achieved through unique design features. As the illustration shows, positive mechanical action bleeds any air or vapor from the hydraulic side between strokes and corrects liquid volume if necessary. Internal liquid end design also automatically eliminates bubbles from the process liquid side.

Very often, a pump chosen for mild corrosive service is obsoleted by a process change specifying a more highly corrosive liquid. But this waste is neither necessary nor desirable. The diaphragm liquid end illustrated can easily be substituted for the conventional liquid end on any standard motor driven controlled volume pump, bringing the entire metering system up to date at little extra expense. *Designs of this type will handle up to 400 gph against heads to 2700 psi.*



Totally Immersed Liquid Ends

Special metering problems demand special pump designs. For example, acids with high vapor pressure or high specific gravity must be pumped with limited suction lifts and generally require suction heads. The ideal answer is the standard Mersemetric® controlled volume pump. Pump drive and motor are mounted on the tank top, but the liquid end is completely submerged to a depth of up to fourteen feet. This same design feature also eliminates the need for tank connections below liquid level, and permits chemicals to be metered *directly* from storage.

The maximum safety-minimum handling Mersemetric design is just about standard for metering sulfuric acid for demineralizer regeneration and pH control of cooling tower water and deaerator effluents. *Capacities up to 218 gph, pressures up to 1200 psi.*

The Acid Metering System

You can be fairly sure of making the right choice only if you consider *all* the factors. Here's a convenient checklist of a few points that are often overlooked:

- Is the entire *system* corrosion-resistant . . . storage tank, suction and discharge piping, controlled volume pump, and relief valve?
- Have you thoroughly considered the physical properties of the liquid? High vapor pressure or high specific gravity liquids may demand a suction head.
- Have you considered plant and personnel safety under all possible conditions?
- Have you considered maintenance as well as first cost in determining the economics of the system?

If precision pumping of dangerous chemicals is one of your problems, look again to Milton Roy's 25 years of experience for your most economical solution. Write for a general introduction to controlled volume pumping in Bulletin 553-1. Milton Roy Company, 1300 East Mermaid Lane, Phila. 18, Pa.

Controlled Volume Pumps • Quantichem Analyzers • Chemical Feed Systems

milton Roy
CHEMICAL INSTRUMENTATION SYSTEMS

Check 3394 opposite last page.

...specify PITT CHEM *Insul-Mastic* 553

Do you have a corrosion problem that requires the protection of a heavy duty coating *plus* a degree of thermal insulation? You can solve it efficiently and economically with a *single* coating—*Insul-Mastic 553.*

This tough, durable mastic contains a high percentage of granulated cork. Applied to a ⅜" thickness, it will reduce heat loss through steel plates 40 to 65% ... and provide excellent condensation control.

Because it is formulated with mica and a high percentage of Gilsonite, Insul-Mastic 553 is virtually unaffected by acids, alkalis, moisture and weather. It can be spray-applied in one continuous, uniform coating to metal, masonry or ceramic surfaces.

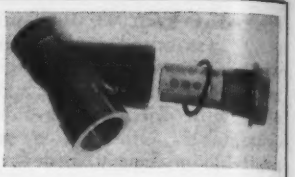
Refrigeration tanks, metal roofs, piping and metal sidings are just a few of the places where you can stop corrosion, reduce heat losses and prevent condensation with Insul-Mastic 553. *Call your Pitt Chem Distributor for full information and recommendations, today!*

PITT CHEM Industrial Coatings are available through leading Industrial Distributors. See the "Yellow Pages."

★ PITT CHEM "Insul-Mastic"® Gilsonite-Asphalt Coatings
★ PITT CHEM "Tarset"® Coal Tar-Epoxy Resin Coatings
★ PITT CHEM "Tarmastic"® Coal Tar Coatings

PROTECTIVE COATINGS • COAL CHEMICALS • PLASTICIZERS • ACTIVATED CARBON • COKE • CEMENT • PIG IRON • FERROMANGANESE

Check 3395 opposite last page.



PVC plastic strainers

. . . are designed to trap particles that would be hazardous to internal moving parts of process equipment. Housing, strainer, and gasket of units are constructed entirely of polyvinyl chloride.

Light weight of strainer permits direct installation on delicate equipment. Strainer element is readily accessible for cleaning or replacement. Size range is ½ through 2", with either socket-weld ends for solvent-weld connections or molded-thread ends.

(PVC plastic strainers are product of Vanton Pump & Equipment Corporation, Division of Cooper Alloy Corporation, Hillside, N.J.)

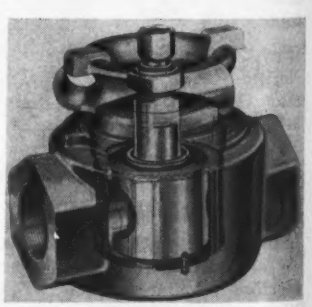
Check 3396 opp. last page.

Non-sticking plug valve is corrosion-resistant, withstands 15,000 psi

Uses: For use in lubricated or non-lubricated service.

Features: Valve is designed so that it never needs adjustment and cannot stick. It has been field tested up to 15,000 psi. It requires a minimum turning force.

Description: Plug's corro-



Valve has a straight cylindrical seat

sion-resistant hard seating surface fits into a set of four metal segments serving as replaceable seats in valve body. Seats are locked together and float slightly due to synthetic elastomer backing. Floating segment design prevents plug from sticking. Resilient seal makes operation easy. Valves are designed to function between −40 and 250°F. They are made in 1 and 2″ sizes.

(Series D plug valve is product of Hamer Valves, Inc., 2919 Gardenia Ave., Long Beach 6, Calif.)

Check 3397 opposite last page.

Pendant pushbutton switch

. . . with Neoprene housing has waterproof, non-corrosive, lightweight construction. Each button is integral part of housing and completely encloses switches for water and weather protection.

Ring shroud protects each button from accidental action from any lateral direction. Roomy interior design permits easy wiring of switches to tables.

Switch is available in either three- or four-button models. Special grommets are supplied with each unit to fit several cable sizes.

(Pendant pushbutton switch is product of Electrical Products Division, Joy Manufacturing Company, 1241 Macklind Ave., St. Louis 10, Mo.)

Check 3398 opposite last page.

Corrosion-resistant pipe, fittings and valves of PVC (CE-56), flexible poly pipe (CE-57) and gear pumps (CE-55), are reviewed in Buls CE-55, CE-56 and CE-57—American Hard Rubber Company, Division of Amerace Corporation, Ace Rd., Butler, N.J.

Check 3399 opposite last page.

AIR POLLUTION

growing problem in the chemical industry

Chemico Gas Scrubbers in 415 Installations Provide 90-99.95% Removal Efficiency

"It is unpleasant at best, and can be fatal," is the sum-up by at least one expert about air pollution. The question generally posed is simply, "What can be done about it?"

The chemical processing industry *is* doing something about it. Chemico Venturi gas scrubbers have already been installed for a variety of chemical processes. One reason: the extreme adaptability of this equipment.

ADAPTABILITY PAYS DIVIDENDS FOR MOST PROCESSES

Depending on local conditions, regulations and operating requirements, Chemico equipment can be tailored to solve a wide variety of pollution control problems. Initial installation can be designed to meet minimum needs. If experience or changing conditions call for increased efficiency, this can be achieved to almost any degree with original equipment by merely increasing the power input. Where power costs are a factor, this flexibility feature of Chemico scrubbers is an important advantage.

SIMPLE CONSTRUCTION SAVES MAINTENANCE COSTS

Design simplicity of Chemico Venturi gas scrubbers means that it is possible to utilize materials resistant to corrosion, abrasion or high temperature. This, plus the fact that no critical controls are necessary, holds maintenance costs to the barest minimum. In addition, the small space requirements and complete flexibility of arrangement of Chemico Venturi scrubbers permit installation in existing plants where space is at a premium.

TYPICAL INSTALLATIONS

IRON & STEEL INDUSTRY —
Gray Iron Cupola; Oxygen Steel Converter; Steel Open Hearth Furnace (Scrap); Steel Open Hearth Furnace (Oxygen Lanced); Blast Furnace (Iron); Electric Furnace; Rotary Kiln–Iron Reduction; Crushing & Screening.

CHEMICAL INDUSTRY —
Acid-Humidified SO_3 (a) Scrub with Water (b) Scrub with 40% Acid; Acid Concentrator; Copperas Roasting Kiln; Chlorosulfonic Acid Plant; Dry Ice Plant; Wood Distillation Plant; $TiCl_4$ Plant, TiO_2 Dryer; Spray Dryers; Flash Dryer; Potassium Phosphate; Chemical Incinerator.

NON-FERROUS METALS INDUSTRY —
Blast Furnace (Sec. Lead); Reverberatory Lead Furnace; Ajax Furnace-Magnesium Alloy; Zinc Sintering; Reverberatory Brass Furnace.

MINERAL PRODUCTS INDUSTRY —
Lime Kiln; Asphalt Stone Dryer; Cement Kiln; Dolomite Kiln; Magnesia Kiln.

PETROLEUM INDUSTRY —
Catalytic Reformer; Acid Concentrator; TCC Catalyst Regenerator.

FERTILIZER INDUSTRY —
Fertilizer Dryer; Superphosphate Den & Mixer.

PULP & PAPER INDUSTRY —
Lime Kiln; Black Liquor Recovery Boiler.

MISCELLANEOUS —
Pickling Tanks; Boiler Flue Gas; Sodium Disposal Incinerator.

FULL DETAILS AVAILABLE—For your copy of a new brochure giving complete data on Chemico Venturi gas scrubbers or for technical assistance on a specific problem, write to the address below.

CHEMICO

CHEMICAL CONSTRUCTION CORPORATION
525 West 43rd Street, New York 36, New York

CHICAGO • DALLAS • HOUSTON • PORTLAND, ORE. • TORONTO • LONDON • PARIS • JOHANNESBURG • TOKYO

Check 3400 opposite last page.

Photo by courtesy of the United Kingdom Atomic Energy Authority

LaBour Pumps Handle Tough Atomic Energy Jobs

The LaBour Type G Packingless Pumps in the picture are part of more than 250 LaBour Pumps in this one establishment of the United Kingdom Atomic Energy Authority. Where the job is difficult, or where failure of a pump can be especially costly or hazardous, you are likely to find LaBour Pumps on the job. British engineers, like those in the rest of the world, know that when you can't afford to take a chance you take a LaBour.

The pumps in the photograph were built by British LaBour Pump Company, Ltd., in London. In every essential respect, including the carefully controlled casting of corrosion resistant alloys and the final performance check before delivery, they are identical with American-built LaBour Pumps.

British or American, LaBour means dependability in pumping service—and the dependable pump is always the economical one, too. We'll be glad to show you what a LaBour Pump can do for *you*. Just ask us.

ORIGINAL MANUFACTURERS OF THE SELF PRIMING CENTRIFUGAL PUMP

LABOUR

THE LaBOUR COMPANY, INC. • ELKHART, INDIANA, U. S. A.

Check 3401 opposite last page.

Meter removes guesswork from corrosion problem on inhibitor selection

Problem: Failure to determine and utilize an effective inhibitor resulted in tubes in reboiler of diethanolamine cycling stream being corroded into uselessness in one to three months at Union Oil Company's Los Angeles Refinery.

Solution: Portable corrosion meter was utilized to evaluate effectiveness of various inhibitors. Similar tests were conducted to determine optimum dosage of selected inhibitor.

With meter in constant contact with corrosive liquids in reboiler, operating personnel take corrosion measurements on regular basis. When corrosion is detected, inhibitor is added accordingly.

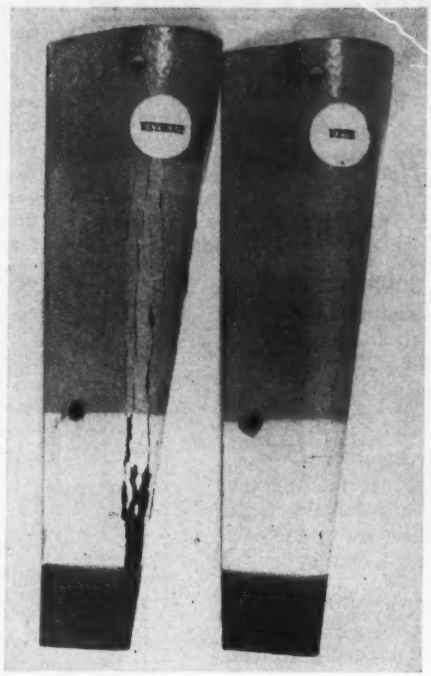
Meter measures corrosion by determining resistance ratio of two metal specimens. One is exposed to corrosive environment, while other is protected by plastic or glass coating. Electrical resistance increases in proportion to chemical attack on exposed strip. Protected specimen remains unchanged in electrical-resistance properties.

Utilization of portable meter permits selection of optimum type and dosage of inhibitor

Results: Selection of optimum inhibitor type and dosage has provided constant corrosion protection. Tube life has been extended 5 to 10 times. Also, costly over-addition of inhibitor is precluded.

(Corrosometer is product of Crest Instrument Company, Division of Magna Products, Inc., 11808 S. Bloomfield Ave., Santa Fe Springs, Calif.)

Check 3402 opposite last page.



Panels coated without and with primers containing phenolic penetrating liquid after weatherometer and bend tests. Panels were rusty and had not been wire brushed or sand-blasted

Primer penetrates rusty surfaces

Laboratory and field tests have shown material to have excellent adhesion, flexibility, blister resistance, and durability

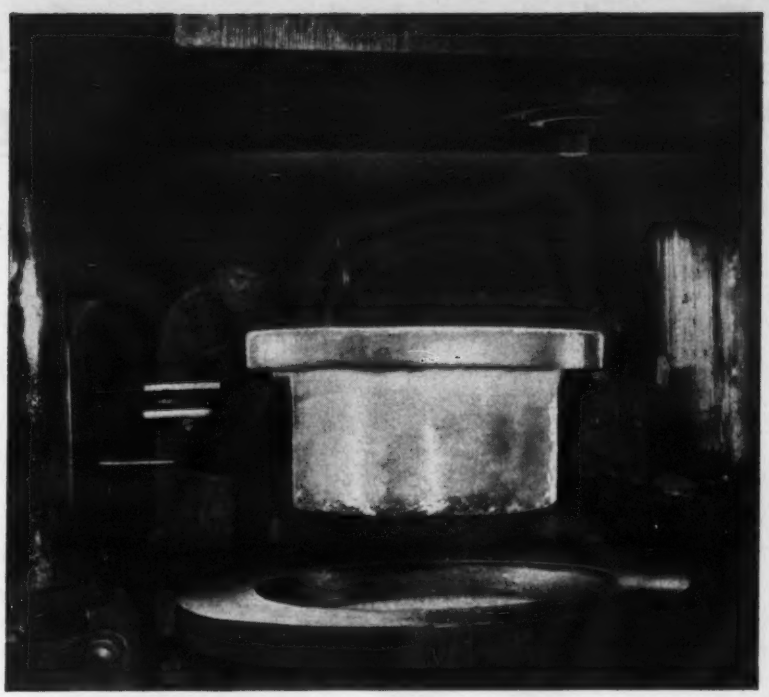
A recently developed phenolic resin wetting agent, called Rustmaster, for which patent application has been made, gives a primer with improved properties. Primers that contain the resin vehicle have excellent adhesion, flexibility, blister resistance, and surface penetration for both clean and rusty surfaces.

Penetrating liquid draws the vehicle as well as the pigment portion of primer down into the pores of the metal so that the primer is both in and on the surface. A definite need exists for a primer of this type since in many cases only surface preparation is wire brushing to remove loose scale. This primer penetrates into tight scale remaining and adds longer service life to protective coating system.

Properties of phenolic resin penetrating liquid follow:

Wt/gal	7.40-7.44
Viscosity	A-one bubble
Iodine No.	110-120
Sapon No.	135-150
Non vol by wt	82-83%
Rosin material	Absent
Hydroxyl value	1.3-1.5
Acid No.	10-12

Example of performance of primer with penetrating liquid is shown in accompanying photograph. Both panels



IN **LENAPE** WELDING CONNECTIONS,
YOU MAKE THE CHOICE

For pressure vessels, Lenape gives you the widest choice of seamless forged welding connections that meet your requirements for:

TYPE—Your choice of Seamless Long Welding Necks; Type H Heavy Reinforcing Necks; Studding Outlets; Type S Nozzles; new Seamless Welding Extensions; Internal or External Reinforced Nozzles; ASA Flanges and new Dished Blind Flanges.

MATERIAL—Your choice of carbon steels, T-1, high temperature-low alloy and stainless compositions.

SIZE-PRESSURE CLASS—Your choice of size and pressure class that meet all ASME requirements.

LOW COST. Specialized manufacturing techniques make even standard LENAPE Seamless Welding Necks cheaper than fabricated necks in most sizes—plus the wide variety of low cost connections available exclusively from LENAPE.

Write today for full information about LENAPE Welding Connections.

LENAPE PRESSURE VESSEL CONNECTIONS

See our standard line of pressure vessel connections on pages 1128-1129 in the 1958 Chemical Engineering Catalog.

LENAPE HYDRAULIC PRESSING & FORGING CO.
DEPT. 100 WEST CHESTER, PA.
RED MAN PRODUCTS

Check 3403 opposite last page.

were coated with primer, intermediate coat, and top coat. In one case primer contained the penetrating liquid. In the other it did not.

Panels were exposed in weatherometer for 325 hr, which is equivalent to one year Florida exposure. Panels were not cleaned. After removal from weatherometer, they were placed on a conical mandrel bend tester. Bend ranges from ¼" mark and 320° mark at bottom up to 1" mark and 90° at top.

As shown, the primer containing the penetrating liquid on right shows no loss of adhesion over rusty surface — whereas conventional primer at left stays on outer surface and coating pops off on bend test.

Field tests conducted during past year have confirmed the improved protection given by primer containing the phenolic penetrating vehicle.

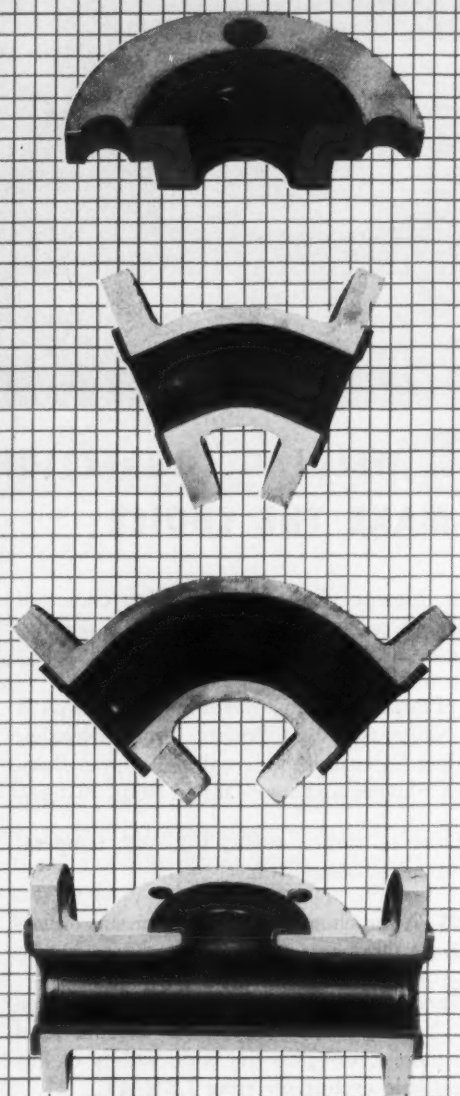
Vehicle can be used with all primer pigmentations — such as a red lead, a zinc chromate, or other anti-corrosive pigments. In all formulations tested, penetrating liquid increased the durability of the primer.

(Rustmaster penetrating liquid and primers made from the material are products of The Glidden Company, 900 Union Commerce Bldg., Cleveland 14, Ohio.)

Check 3405 opposite last page.

"He really is a stickler for accuracy, isn't he?"

Designed for performance
Lined for permanence



with Fluoroflex-T*
...Teflon at its best*

UNIVERSALLY INERT, CORROSION-PROOF pipe and fittings are ideal for service to 500°F with virtually all known chemical and corrosive solutions. Liners are of Fluoroflex-T... a special, high density, non-porous compound of Teflon.

NON-CONTAMINATING Fluoroflex-T liner is formed over the gasket face of the flange—eliminates any contact between the materials being handled and the metal housing.

STREAMLINED—Smooth contours and seamless liner of Fluoroflex-T in all fittings mean a minimum of turbulence and back pressure.

SPACE-SAVING—ASA short radius housings keep pipe runs compact, give tight turns in close quarters.

ECONOMICAL—Chemically inert liner and strong ductile iron housings give *permanent* fitting life – eliminate maintenance and replacement costs.

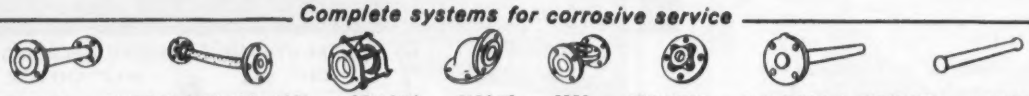
USEFUL IN ANY STANDARD SYSTEM—Fittings are compatible with any flanged metal, ceramic, plastic or lined piping system in current use.

SEND FOR DATA on Fluoroflex-TS pipe and fittings for complete piping systems. Write for further information to Dept. 291, RESISTOFLEX CORPORATION, Roseland, N. J. Other Plants: Burbank, Calif.; Dallas, Tex.

**Fluoroflex is a Resistoflex trademark, reg., U.S. pat. off.*
**Teflon is DuPont's trademark for TFE fluorocarbon resins*

RESISTOFLEX

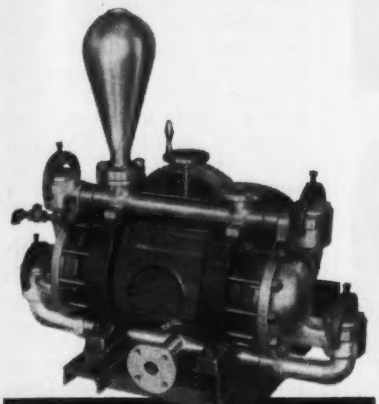
Complete systems for corrosive service



LINED STEEL PIPE • FLANGED FLEXIBLE HOSE • BELLOWS • ELBOWS • TEES • REDUCERS • DIP PIPES & SPARGERS • LAMINATED PIPE

Check 3404 opposite last page.

NEW FEATURES INCREASE SERVICE LIFE



the NEW SHRIVER DIAPHRAGM PUMP for those "TOUGH" MATERIALS

- Simplified drive and diaphragm support mechanism increase operating life and facilitate maintenance.
- Complete diaphragm support mechanism may be removed as a unit, without disturbing existing piping.
- Liquid ends may be removed easily for inspection and cleaning.
- Slurry blow-off protects pump in event of diaphragm failure in operation. Slurry cannot affect working mechanism.
- Adjustable stroke—optional—available for varying pump capacity; without need for expensive variable speed drive.
- Pumps at discharge pressures to 100 psi, lift of 10′ of water for long periods, 15′ to 18′ for short periods.

Learn why this easy-to-clean, simple-to-maintain pump is right for your corrosive, abrasive, viscous, thick, heavy, quick-settling or sensitive fluids. Write for Bulletin 143.

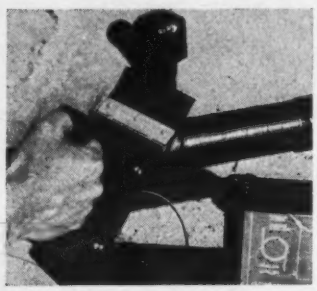
T. SHRIVER & CO., Inc.
846 Hamilton St., Harrison, N. J.
Sales representatives in
Atlanta, Buffalo, Chicago, Detroit, Houston, Los Angeles, St. Louis, San Francisco, Montreal, Toronto, Mexico City

Check 3406 opposite last page.

Light holiday detector for tape coatings weighs 3¾ lb

Electrode blade is constructed of silicone rubber

Uses: Primarily for electrical inspection of pipe or metal surfaces wrapped with protective tapes such as polyethylene types of materials. Portable unit may be used to test plastic-tape applications on steel joints, tees, valves, and fittings.



Portable holiday detector can be used to test application of plastic tape on field joints, tees, valves, and fittings

Features: Detector has operating weight of 3¾ lb. Electrode blade is reinforced conductive silicone-rubber material.

Description: Holiday detector has detachable silicone-rubber electrode. When spark discharge occurs through perforation in tape wrapping, it is audibly amplified in speaker mounted within dectector.

Unit is housed in 3/16″ thick Royalite plastic case with insulated plastic handle. Standard blade width is 3½″, but blades of 6 or 12″ widths are available.

(Model LS-1 holiday detector is product of Tinker & Rasor, P.O. Box 281, San Gabriel, California.)

Check 3407 opposite last page.

Molybdenum containing alloys are topic of 10-page booklet, incorporating information on composition ranges, mechanical properties, corrosion-resisting properties and high-temperature mechanical properties. "PH55 Alloys"—Cooper Alloy Corporation, Hillside, N.J.

Check 3408 opposite last page.

Life in these excited states...

Corrosion is full of surprises

Out-guessing corrosion has been our business for 100 years. We now make 8 types of chemical resistant pipe . . . with valves, pumps, and tanks to match . . . and pretty well know what to expect with them. If anything, our advice is on the *safe* side. Please consult us with *any* problem.

RIVICLOR *for ageless strength*

All-purpose rigid PVC. Sched. 40, 80 & 120, ½ to 4". Threaded or socket-weld fittings. Valves ½ to 2". NSF-approved. *Bul. CE-56.*

NEW ACE Gear Pump

Improved design . . . now 12 gpm. All wetted parts acid-resistant, wear-resistant Ace hard rubber. Finest available. *Bul. CE-55.*

SUPPLEX *tops in economy*

Flexible poly pipe, ideal for water lines, drains, underground pipe or conduit. Sizes ½ to 2", long coils, NSF-approved for drinking water. *Bul. CE-57.*

VALVE HEADQUARTERS

World's best chemical valves . . . at moderate prices. All-plastic, rubber-lined, or all-hard-rubber. ¼" pet cocks to 24" gate valves.

ACE processing equipment of rubber and plastics

AMERICAN HARD RUBBER COMPANY
DIVISION OF AMERACE CORPORATION
Ace Road • Butler, New Jersey

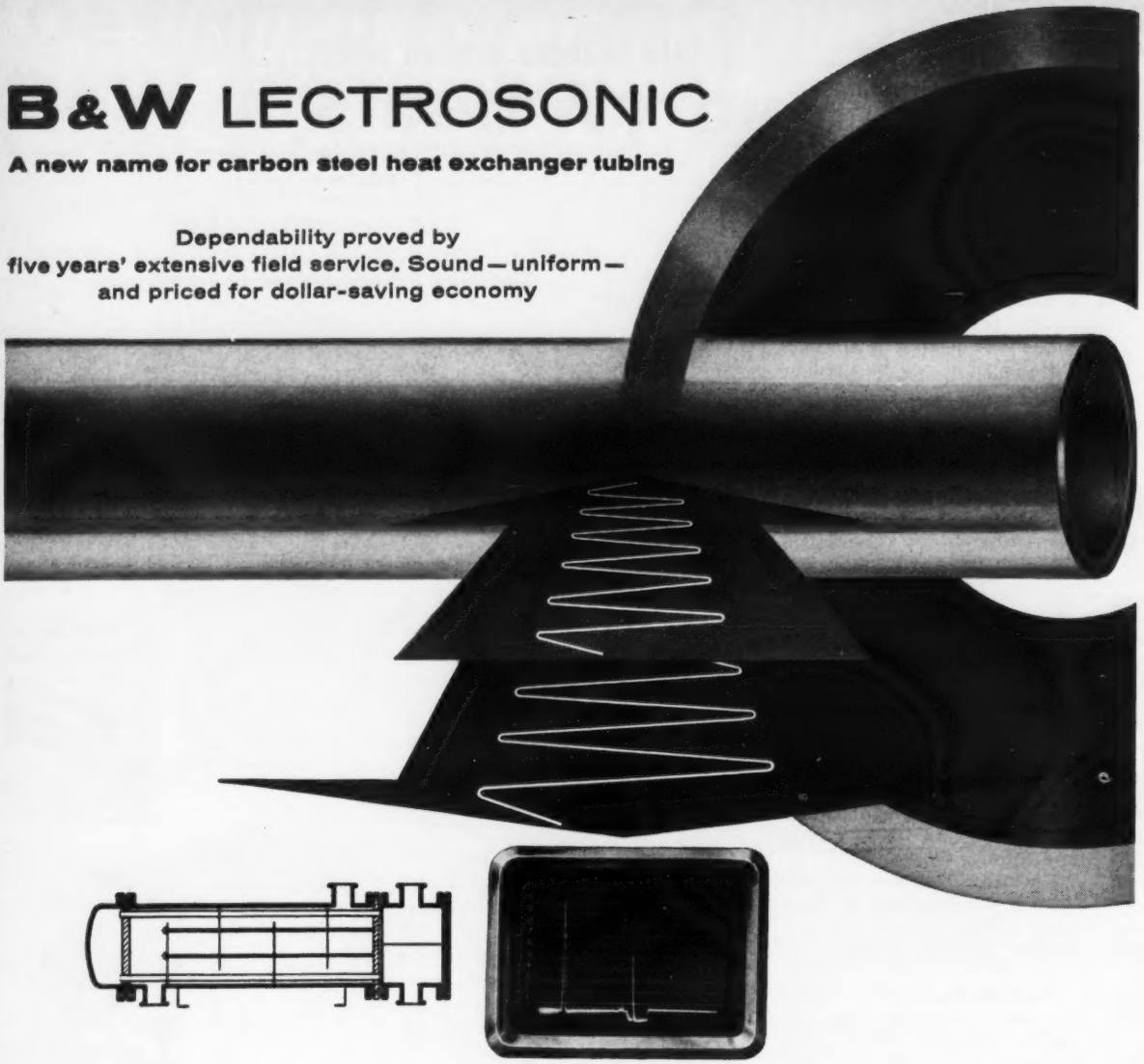
See our pages in ree Catalog!

Check 3409 opposite last page.

B&W LECTROSONIC

A new name for carbon steel heat exchanger tubing

Dependability proved by five years' extensive field service. Sound—uniform—and priced for dollar-saving economy



Now, B&W brings you a new concept in heat exchanger tubing—B&W LECTROSONIC. Produced under the most exacting quality control methods in the industry, LECTROSONIC tubing fits right, and rolls in easily because it's dimensionally accurate, and uniform.

Continuous ultrasonic inspection—plus destructive and hydrostatic testing, visual inspection, and magnetic particle inspection, are five ways used to check the weld of B&W LECTROSONIC Tubing for your assurance of dependability.

B&W LECTROSONIC Tubing was developed to meet the needs of the petrochemical industry for an electric resistance welded carbon steel tube that is easily workable, strong, and less costly than seamless tubing which it is designed to replace.

Produced in all standard sizes. Available now through distributors or direct from B&W.

Write for B&W Bulletin TB-431 for full information, or call your nearest B&W District Sales Office. The Babcock & Wilcox Company, Tubular Products Division, Beaver Falls, Pennsylvania.

Chemical Show Booth 1002
Coliseum, New York
November 30-December 4

B&W THE BABCOCK & WILCOX COMPANY

TA-9034-WP5

TUBULAR PRODUCTS DIVISION

Seamless and welded tubular products, solid extrusions, seamless welding fittings and forged steel flanges—in carbon, alloy and stainless steels and special metals

Check 3410 opposite last page.

Titanium pumps, valves available

Centrifugal pumps and valves made of commercially pure titanium are now being manufactured. Plug valves fabricated from titanium are available in sizes from ¼ through 3". K and Y valves, with all parts in contact with corrosive solution fabricated from titanium, can be obtained in size range of 1 through 4".

(Titanium is product of Mallory-Sharon Metals Corp., Niles, Ohio.)

Check 3411 opposite last page.

(Titanium pumps, valves are product of The Duriron Company, Dayton, Ohio.)

Check 3412 opposite last page.

PVC-lined fittings easily joined

Uses: Although designed for use with PVC-lined pipe, lined fittings may also be used with standard weight pipe with uncoated interiors or with linings of rubber, plastic, or cement. They can also be used with lined or unlined lightweight steel or aluminum pipe and tubing.

Features: Fittings can handle slurries and abrasive solids in suspension at pressures up to 1000 psi. They are re-

PVC-lining is lapped around ends, providing an effective seal with coupling gasket against corrosion

sistant to numerous acids, alkalis, salts, plating solutions, and miscellaneous chemicals.

Description: PVC-lined fittings are available in malleable iron or aluminum. They are supplied with grooved ends for quick-jointing pipe with mechanical couplings. Lining is ⅛" thick and is firmly bonded to interior and ends. Fittings are available in in elbows, tees, reducers, caps, and nipples in sizes from 1¼ through 12" diameters.

(PVC-lined fittings are product of Victaulic Company of America, Elizabeth, N.J.)

Check 3413 opposite last page.

For more information on developments reported in this section, check corresponding numbers on Reader Service Slip opposite last page of this issue.

Mn-alloyed wrought iron has low-temperature impact properties

Better impact and low-temperature properties than most steels are reported for a specialty wrought iron developed for uses where the possibility of brittle failure poses engineering problems.

Defined as highly deoxidized wrought iron with lowered phosphorous and carbon content, alloyed by the addition of approximately 1% manganese, it is available in tubular and flat-rolled forms.

Corrosion resistance, weldability, and working properties are comparable to manufacturer's wrought iron.

(Mn wrought iron is product of A. M. Byers Company, Clark Building, Pittsburgh, Pennsylvania.)

Check 3414 opposite last page.

Aluminum, used as structural material to preclude corrosion, is subject of single-page reprint "In The Fight Against Corrosion"—Reynolds Metals Company, Reynolds Metals Building, Richmond 18, Virginia.

Check 3415 opposite last page.

An Important Message

ABOUT TANTALUM EQUIPMENT

AND WHAT TO EXPECT FROM FANSTEEL

WORLD'S LARGEST TANTALUM BAYONET HEATER

Since 1937, when Fansteel produced the first tantalum bayonet heater, many thousands, of varied sizes and shapes, have been put into service. Their record of performance (over twenty years of continuous duty is not unusual) is truly outstanding.

The unit illustrated is the largest tantalum bayonet heater ever produced, *thus far.* Made up of 36 tantalum tubes, 1½" dia. x 72", it provides 75 sq. ft. of heat transfer surface. It was designed for use with 160 psig steam to heat a nitric acid mixture.

Samples of metals for testing are available upon request; arrangements can be made for the loan of certain equipment for pilot operations or heat transfer studies.

More tantalum equipment engineered and fabricated by Fansteel is in use today in a greater diversity of chemical processes than at any time in history. This equipment includes heat exchangers, evaporators, stills, condensers, coils, bayonet heaters, instrument protection—all used under extremely corrosive conditions where long equipment life, freedom from product contaminations and undesirable side reactions make the use of tantalum a necessity.

Fansteel is properly proud of this contribution to the chemical industries, a contribution, indeed, which has been recognized by several national awards.

However, it is not enough merely to attain a position of leadership; it must be kept. And Fansteel has taken these steps to be of greater service to our chemical industry customers:

Tantalum Plentifully Available. As you read this, the tantalum production at both our North Chicago and Muskogee, Oklahoma plants is at record levels. Short of total war, there will always be an ample supply of tantalum for chemical equipment.

Improved Delivery Service. New equipment has been added in our fabrication shops, particularly equipment for improved welding. Tapered tantalum condensers (Cat. No. D-4538) are presently stocked for immediate delivery. A stock of tantalum bayonet heaters, in several sizes, will also be available soon.

One Integrated Responsibility. Fansteel is the one supplier of tantalum equipment who performs the entire job—produces the metal from the ore, engineers the application, designs and builds the suitable equipment. With Fansteel, there can be no divided responsibility.

Other Materials of Construction. Fansteel is fabricating equipment from other materials of construction, such as columbium, molybdenum, tungsten, zirconium and titanium. While these metals are not as highly resistant to corrosion as tantalum, they all have desirable properties for chemical processes applications.

Engineering and Design. Fansteel is always ready to undertake the task of converting your problem into a reliable piece of equipment, when it comes within the scope of our materials and experience. This means that we will design and fabricate the equipment and, if desired, assist in installation.

SINCERELY,

Frank N. Riggs
PRESIDENT

Address your inquiries to Equipment Department, Metals Fabrication Division

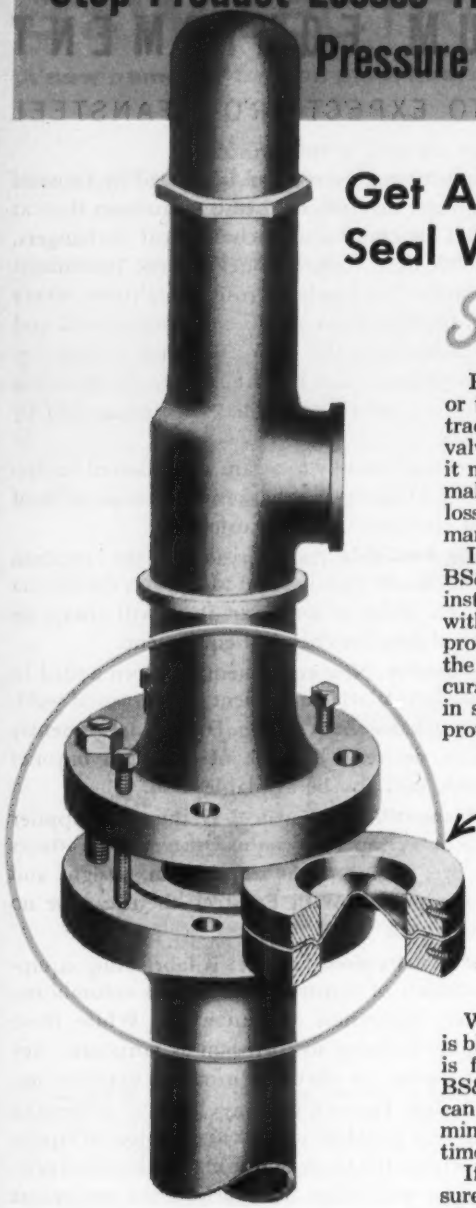
G592

FANSTEEL METALLURGICAL CORPORATION
North Chicago, Illinois, U.S.A.

FANSTEEL

Check 3416 opposite last page.

Stop Product Losses Through Leaking Pressure Relief Devices!



Get A "Bottle-Tight" Seal With BS&B *Safety Heads!*

Product loss in a processing or transfer system can often be traced to leaking pressure relief valves. To make matters worse, it may be extremely difficult to make repairs that will stop this loss with any degree of permanence.

In hundreds of such cases BS&B Quik-Sert Safety Heads, installed upstream and in series with the leaky relief device, have provided the perfect solution to the problem. Pressure relief accuracy is in no way impaired . . . in some cases it is actually improved.

Quik-Sert Safety Head

When pressure in the system is bled back to normal, the valve is free to close as usual. The BS&B Quik-Sert Safety Head can be replaced in a matter of minutes at any later convenient time.

If you need a leak-tight pressure relief assembly for normal operation of your pressured systems, BS&B Safety Head specialists will gladly survey your installation and submit recommendations.

Write now for details.

BLACK, SIVALLS & BRYSON, INC.

Safety Head Division, Dept. 2-M8
7500 East 12th Street
Kansas City 26, Missouri
Telephone: BEnton 1-7200

BS&B — Specialized Reliability — Over 40 Years — Another Example of Product Leadership

Check 3417 opposite last page.

Glassed ductile iron slated for fittings

Uses: Applications with items of glassed-metal construction.

Features: Fittings are extremely strong due to 60,000-lb minimum tensile strength

Glassed ductile iron fittings extend uses of items of glassed-metal construction

of ductile iron. Nodular, rather than longitudinal-flake, form equalizes stress distribution.

Description: Glassed-ductile-iron fittings are resistant to acids, except hydrofluoric, temperatures to 350°F and to 450°F under special circumstances, to most alkalis at moderate temperatures, and to product adherence.

Fittings offered include 45° elbows, 90° elbows, tees, and crosses in 1½, 2, 3, 4, and 6" sizes.

(Glassed ductile iron fittings are product of The Pfaudler Co., Division of Pfaudler Permutit Inc., 1088 West Ave., Rochester, N.Y.)

Check 3418 opposite last page.

UPVC plating-tank pipe doesn't deteriorate

Normal-impact unplasticized polyvinyl chloride pipe and fittings were recently installed in plating facilities of International Business Machines' typewriter plant at Lexington, Kentucky.

Installation was made on basis of evidence from series

SCRUBBING CORROSIVE GASES?

Are your scrubbing nozzles as efficient as you think they could be? Do they resist corrosion or wear conditions satisfactorily—produce the breakup and distribution you would like?

Outline your spray problems for us. If your liquid can be sprayed with direct pressure—Monarch can furnish the nozzles.

NOZZLES FOR:

- OIL ATOMIZING
- HUMIDIFYING
- AIR WASHING
- DESUPERHEATING
- SPRAY PONDS
- MILK POWDERING
- ACID CHAMBERS
- CONCRETE CURING

Write for Catalog I

Monarch
MFG. WORKS, INC.
3403 GAUL STREET
PHILADELPHIA 34, PA.

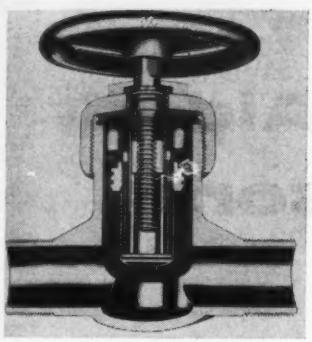
Check 3419 opposite last page.

of laboratory and field tests. Study of corrosion problems indicated that such a move would enhance quality-control program.

In installation, approximately 2000′ of ¾ to 2″ UPVC pipe carry solutions of chloride, sulfur dioxide, and other alkalis and acids. Operating conditions are from atmospheric to 60 psi in temperature range of 60 to 130°F.

(UPVC pipe and fittings were injection molded by Tube Turns Plastics, Inc., 2929 Magazine St., Louisville 11, Ky.)

Check 3420 opposite last page.



Dependable sealing provided by valve

Valve of all plastic construction has a dependable method of tight sealing. Employing a telescopic arrangement instead of a diaphragm, a soft rubber cup is forced to concave bottom of passage. Because of its flexibility, the cup under pressure from the stem seals on all sides against the walls of the body casing, shutting off fluid flow.

Materials available for valve body include polyethylene, Teflon, PVC, polyamid, and acrylonitrile butadiene styrene. Plunger or rubber cup can be made from natural rubber, Buna S, Buna N, neoprene, polyethylene, and polyurethane.

Working pressure of valve is 145 psi. It is available in sizes from 1 to 4″.

(Plastic valve is product of W. S. Rockwell Co., Fairfield, Connecticut.)

Check 3421 opposite last page.

Bacteria and fungi can't pass this protector!

Tris Nitro—Tris(hydroxymethyl)nitromethane—stops fungi and bacteria *dead!* Ideal in cutting oils, oil well flooding, pipe lines and drilling muds—checks unwanted microbiological growth in aqueous systems. Prevents deterioration of non-protein sizing and adhesive solutions during storage. Just 0.1% Tris Nitro safeguarded cutting oil system free of bacterial contamination for over 60 days during recent test—longer than any other compound tested!

The success of Tris Nitro is due to the slow release of bactericidal and fungicidal decomposition products, including formaldehyde. Tris Nitro offers sustained protection for extended periods with no indication of development of resistance. Recent experiments show that formaldehyde is also released at high humidities and high ambient temperatures in the presence of a trace of alkaline material. Tris Nitro is a powerful inhibitor of microorganisms, and in dry form should be evaluated to protect packaged goods from mold attack during shipment and storage.

PHYSICAL PROPERTIES

Formula	**$(CH_2OH)_3\ CNO_2$**
Molecular Weight	**151.12**
Melting Point, °C	**165-170d**
pH of 0.1M Aqueous Solution	**5.6**
Solubility in Water g/100 ml at 20°C	**220**

For Technical Data Sheet No. 29 and sample, write CSC today.

INDUSTRIAL CHEMICALS DEPARTMENT
COMMERCIAL SOLVENTS CORPORATION
260 MADISON AVE., NEW YORK 16, N. Y.
Atlanta • Boston • Chicago • Cincinnati • Cleveland • Detroit • Kansas City
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IN CANADA: McArthur Chemical Co. (1958) Ltd., Montreal • IN MEXICO: Comsolmex, S. A., Mexico 7, D. F.

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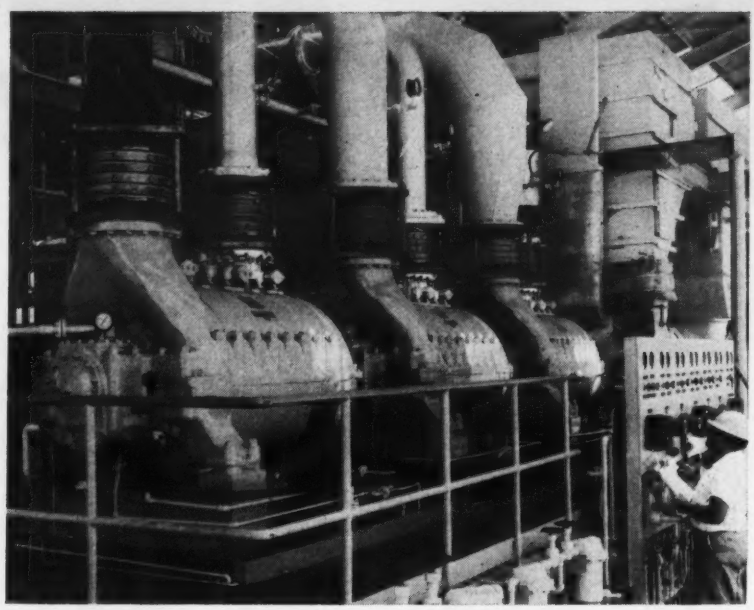
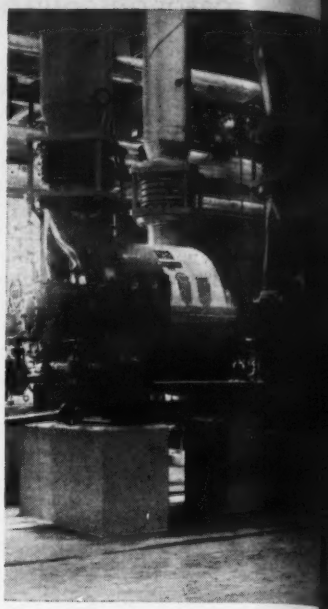


Cracked natural gas compressor installation at the Fortier plant



Acrylonitrile Production Aided By Centrifugal Compressors

Satisfactory service has been provided by 18 units handling a variety of gases in petrochemical plant

GORDON WEYERMULLER
Petrochemical Editor
with **S. S. LABOUISSE**
Plant Engineer
American Cyanamid Company
Fortier, La.

Eighteen single-, double-, and triple-stage balanced centrifugal compressors play a key role in the production of acrylonitrile from natural gas at the Fortier plant of American Cyanamid near New Orleans. About half of the units were installed in 1954 and the other half in 1957 and 58. Many of them have been in practically continuous service since installed.

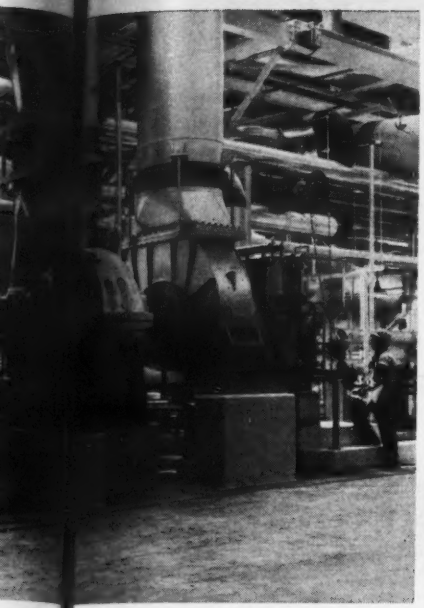
Accompanying table shows design conditions for units and services for which they are used. As indicated in table, capacities vary from 1760 to 27,800 cubic feet/minute.

Compressors are made so that two or more units can be driven by one turbine. All of the units are horizontally split-case compressors, which are most suitable for the moderate pressures in this particular application. Pressures

DESIGN CONDITIONS FOR CENTRIFUGAL COMPRESSORS OPERATED BY THE AMERICAN CYANAMID COMPANY

	COMPRESSED AIR SERVICE						COMPRESSED NITROGEN SERVICE	HYDROCARBON	
Model	3M5	2M6	3M5	2M4 + 1M8	4M5 + 3M5*	5M5 + 4M5	2M4 + 1M8	3M8	3M8-DC
Number of units	One	One	One	One + One	One + One	One + One	One + One	One	One
Number of impellers	5	6	5	4 8	5 5	5 5	4 8	8	8
Impeller diameter	24"	18"	24"	18" 15"	32" 24"	42.5" 32"	18" 15"	24"	24"
Gas handled	Air	Air	Air	Air	Air	Air	Nitrogen	Hydrocarbon	Hydrocarbon
Inlet capacity, cfm	16,400	5000	14,400	5200 2040	27,800 8100	35,700 11,070	4220 1760	10,100	9390
Inlet temperature, °F	100	95	100	80 110	100 110	100 100	80 110	110	110
Inlet pressure, psia	14.5	14.5	14.5	14.88 40.2	14.5 47.5	14.5 44.7	14.6 36.7	2.8	2.94
Discharge pressure, psia	62	49.7	55	42.2 115	49 100	46.2 90	40.2 107	20.6	20.6
Brake horsepower, bhp	2565	685	2015	1260	5580	6530	965	400	380
Speed, rpm	7575	8800	7400	9400	5400	3820	9400	7850	7450

*Two trains, each consisting of one Model #4M5, operating in series with one 3M5



Process compressor installation at American Cyanamid

can be withstood up to 800 psi or higher if required. Removal of upper half of case provides ready accessibility to all components.

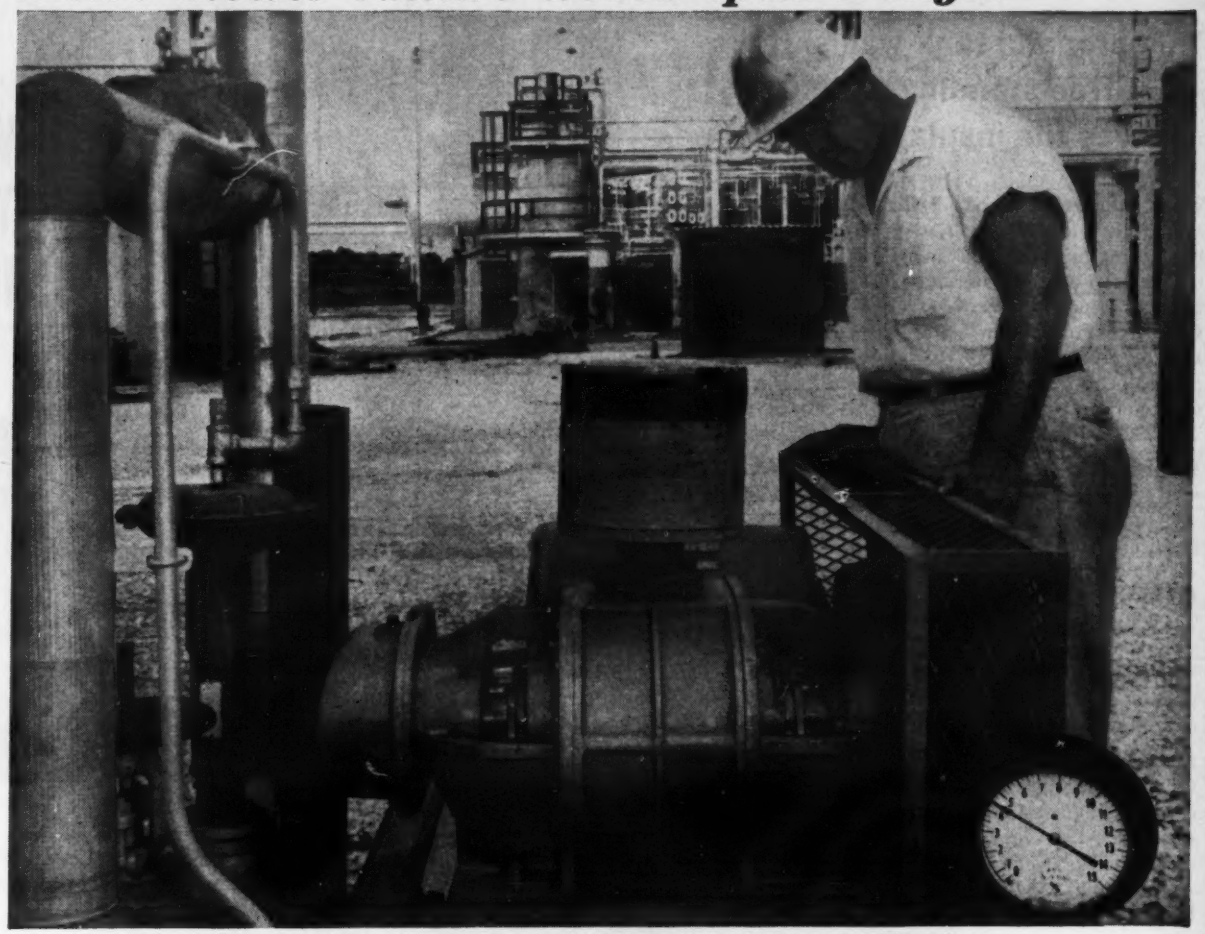
Minimum bearing span permits up to 10 impellers to be utilized in a single case. Design of compressor, integrally supported bearings, assures permanent alignment.

(Centrifugal compressors are product of Clark Bros. Co., One of the Dresser Industries, Olean, N.Y.)

Check 3423 opposite last page.

SERVICE		
3M8-7 + 3M8 + 3M8		
One	+ One	+ One
7	8	8
24"	24"	24"
Hydrocarbon		
17,000	8820	3360
100	105	105
14.88	32.0	73.5
35.5	77	179.7
	4550	
	6650	

where blower failure would spell Danger



Sutorbilt blower at Polymer Chemicals Division plant in Baton Rouge, La. Blower is required at a critical phase of catalyst activation in a new Phillips-type polymerization process.

W. R. GRACE DEPENDS ON A SUTORBILT ROTARY, POSITIVE-PRESSURE BLOWER

At W. R. Grace & Co.'s new Polymer Chemical Division, the catalyst for a new, high-density polyolefin production process must be protected in a pressurized air stream. A doubly-dependable Sutorbilt rotary positive-pressure blower was selected for these three important reasons:

1. Contamination must be avoided
Long-lasting, air-tight, Teflon seals and lack of lubrication in compression chamber prevent air contamination in a Sutorbilt blower.

2. Breakdowns would be dangerous
Simple, rugged, precision construction (only rotors and bearings move) means reliable service. Unit chosen by Grace has been in continuous operation for well over a year without repairs.

3. Pressure must be positive, constant
The two, counter-rotating "figure eight" Sutorbilt impellers produce a positive-pressure, *metered* air supply.

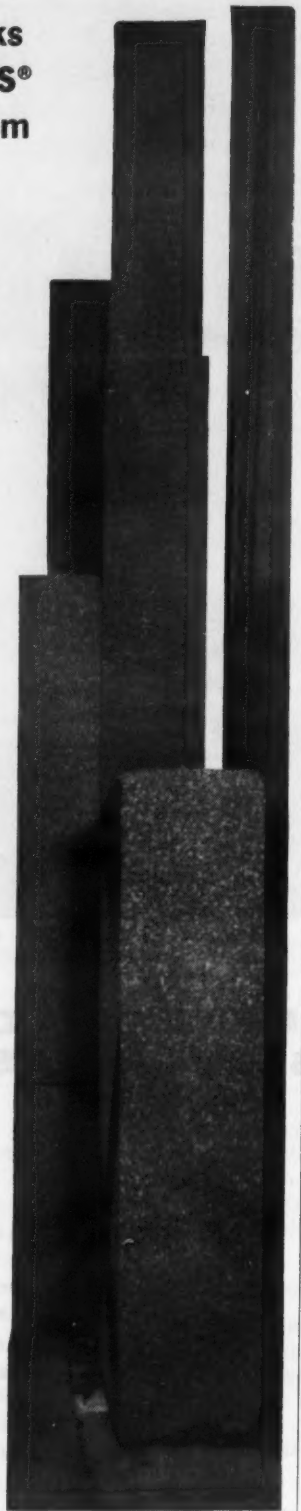
Sutorbilt blowers and gas pumps are precision-built to deliver air or gas in capacities up to 20,000 cubic feet per minute—at pressures up to 10 pounds. Write today for complete, illustrated literature on these efficient, dependable blowers. 1349 8-16

SUTORBILT IS WELL BUILT

CORPORATION, 2966 EAST VICTORIA ST. • COMPTON, CALIF.
SUBSIDIARY OF FULLER COMPANY • CATASAUQUA, PA.

Check 3424 opposite last page.

This propane tank wall shrinks —but free-standing FOAMGLAS® solves the insulation problem



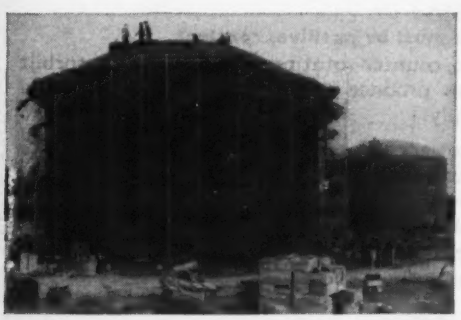
The strength of FOAMGLAS solved an unusual insulation problem posed by contracting tank walls in the nation's first refrigerated propane storage plant. Designed and built by Stone & Webster Engineering Corp. for the Atlanta Gas Light Company, the storage facilities at Riverdale, Georgia, consist of three steel tanks. Each is 70 ft. in diameter and 52 ft. high with a capacity of 1,297,500 gallons of refrigerated propane.

When the tanks are pulled down to an operating temperature of —46°F., their walls contract. Ordinary insulations—applied in direct contact with the tank walls—just won't work. But the unique strength of FOAMGLAS permits its use as a free standing wall of insulation . . . self-supporting and separated from the tank walls by an air space. The same high compressive strength permitted placing FOAMGLAS beneath the tank floors as well as on the tank roofs.

Insulating performance? FOAMGLAS is completely moisture-proof to insure constant high insulating value for the life of the tanks . . . prevent condensation or freezing of moisture between insulation and tank walls. And, since FOAMGLAS can't absorb volatile hydrocarbons, it never becomes a fire hazard.

Check the unique combination of benefits offered only by FOAMGLAS. Write to: Pittsburgh Corning Corporation, Dept. CP-89, One Gateway Center, Pittsburgh 22, Pennsylvania. In Canada: 3333 Cavendish Blvd., Montreal, Quebec.

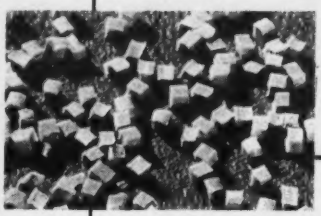
Pittsburgh Corning offers a complete line of mastics, tank coatings and other accessory materials specifically designed for use with FOAMGLAS.

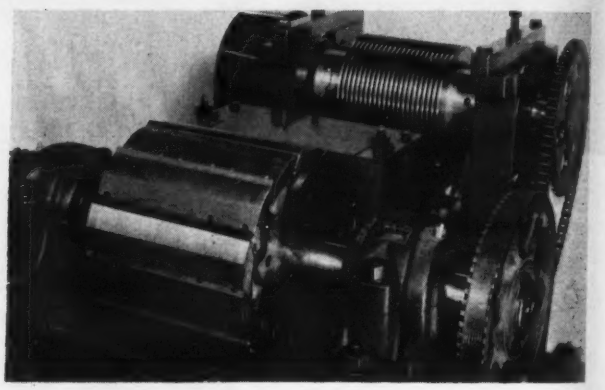


PITTSBURGH PC CORNING

Check 3425 opposite last page.

HOW TO CUT UNIFORM PELLETS





Note even size of pellets, the absence of longs and fines. This is the kind of pellet that the majority of American manufacturers of plastics materials such as polyethylene, polystyrene, nylon, rubber, vinyls, are cutting today on Taylor-Stiles machines. There's a good reason for this preference — longs cause bridging in the extruder or molding machine, slow down the flow of material, and reduce production. In injection molding the feed is by gravity and is, therefore, very susceptible to blocking by longs.

Again, materials have to be brought to a definite melting point and, naturally, will reach that temperature together only if pellets are of the same size. If longs are mixed in with small pellets, the compound will have to be exposed to more heat in order to melt those longs, and the smaller sized pellets will be exposed to excessive heat.

The objection to fines is equally important. The heat of the machine may heat the hopper, cause the fines to agglomerate, and block up the hopper. If they "Cement", they may completely stop the feed.

If you want to produce pellets that are uniform in size and that make for uniform molding and extruding; write today for folders illustrating and describing Taylor-Stiles Pelletizers.

TAYLOR, STILES & COMPANY
20 BRIDGE STREET RIEGELSVILLE, NEW JERSEY

Check 3426 opposite last page.

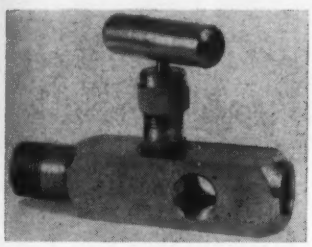
Single-unit gage valve is a compact solution to mounting problem

Uses: Designed to replace conventional fittings and pipe used to mount gage and gage valve.

Features: Heavy male inlet connection provides safe method of connecting gage valve to process coupling.

Description: Gage manifold valve is single compact barstock assembly. Triple female outlets make provision for mounting gage, gage bleed-off, drain, sampling connection, or additional pressure-pickup points.

Rising-plug-type unit incorporates replaceable Kel-F



Heavy male outlet of single-unit manifold gage valve provides safe method of connection to process coupling

seat insert, Teflon stem packing, and straight-through flow passage for rodding-out.

Entire unit is machined from stainless-steel barstock and is rated at 5000 psig at 250°F. Inlet connection may be either ½ or ¾" NPT and outlets either ½ or ¼" female NPT.

(M5 manifold gage valves are product of Industrial Products Division, Anderson, Greenwood & Co., 5425 N. Rice Ave., Houston, Tex.)

Check 3427 opposite last page.

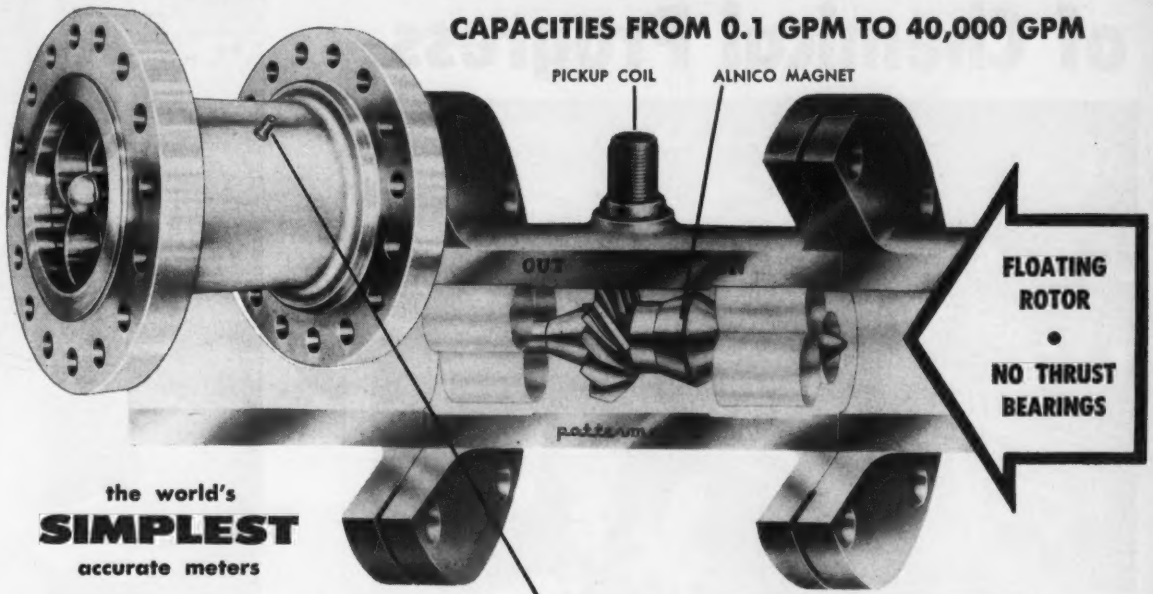
Tank capacity slide rule, for calculating tank volumes in cubic feet, Imperial or U.S. gallons or barrels (55-, 42-, or 31-gallon) when given height of tank and diameter or circumference in feet. It has volume equivalent tables on back. Tank Capacity Calculator—Solar Chicago, Division of U.S. Industries, Inc., 6400 W. 66th St., Chicago 38, Ill.

Check 3428 opposite last page.

pottermeter BOWSER

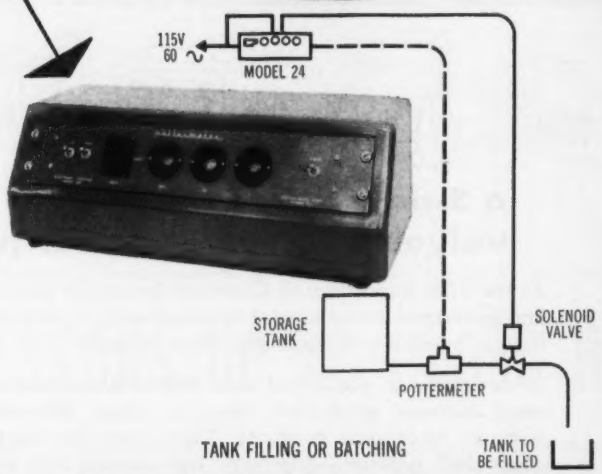
INLINE ELECTRONIC TURBINE TYPE METERS

CAPACITIES FROM 0.1 GPM TO 40,000 GPM



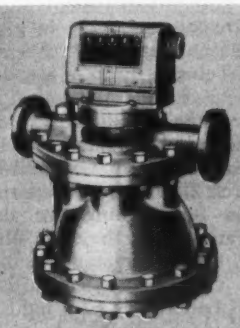
the world's **SIMPLEST** accurate meters

An Alnico magnet in the turbine rotor generates electric current directly proportional to the flow rate in the pipe. This activates readout or control equipment located at or remote from the Pottermeter unit.



PROVIDES BASIC INSTRUMENTATION FOR ANY AUTOMATION SYSTEM

Operating by gravity or pump pressure, Pottermeters are available in all pipe sizes. Electronic totalizers, recorders or controllers meet any need for automated liquid process or transfer operations. Potter-Bowser sales engineers in principal cities confer promptly with systems or plant engineers to detail availabilities and application data.

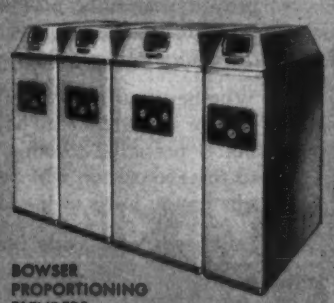


BOWSER XACTO METERS

BOWSER XACTO METERS AND PROPORTIONERS
positive-displacement piston type

Wherever mechanically driven readout and control equipment is indicated, and where positive-displacement metering is needed or costs less, Bowser Xacto Meters (leading all others in industry) are unexcelled for dependability and accuracy. Capacities: 6 GPH to 250 GPM

Xacto Meter equipped proportioners are used to blend two or more liquids in continuous flow at accuracies to ¼ of 1 percent. First in lube oil blending, Bowser proportioners also handle most other liquids used by process industries.



BOWSER PROPORTIONING BLENDERS

Write For Catalog

Potter-Bowser Division BOWSER, INC. Fort Wayne, Indiana

Check 3429 opposite last page.

Welcome to the "university" of Chemical Progress

a 5-day "curriculum" valuable to you and your job

At the 27th Exposition of Chemical Industries you can see and learn more about newest developments in your industry than is available through any other channel.

Under one roof you'll find over 500 exhibits—ways to cut costs, increase production, step up plant efficiency and improve your own products. There will be displays of plant and process equipment, instruments and controls, material handling and packaging equipment, new and improved materials, *plus* special sections for chemicals and laboratory equipment and supplies. Compare, judge new developments in your fields of interest.

Whether your responsibility is management, design, production or research you will be fortified with new ideas and better prepared to cope with tomorrow's problems. A visit to the Exposition will be one of the most profitable investments you have ever made.

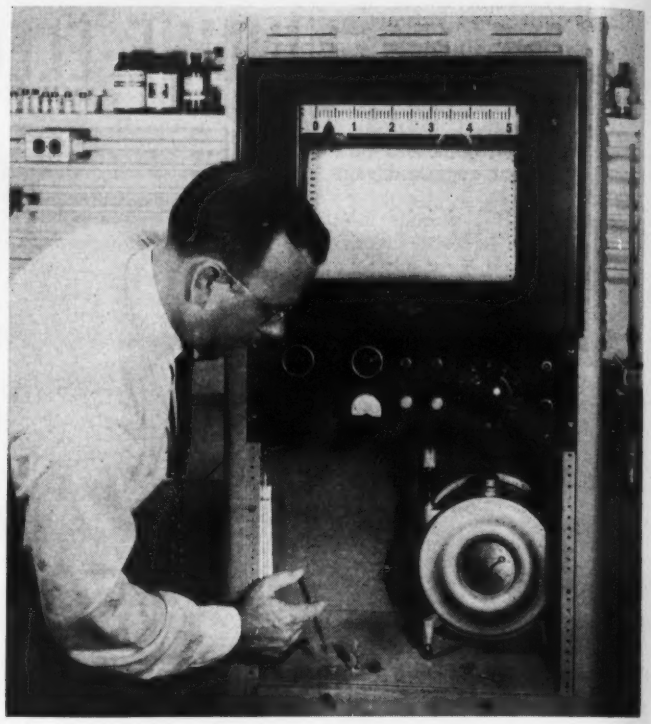
Set these dates aside now—and bring your key associates.

2201

27th EXPOSITION OF CHEMICAL INDUSTRIES
N. Y. COLISEUM · NOV. 30—DEC. 4.

Management: International Exposition Co., 480 Lexington Ave., New York 17, N. Y.

Check 3430 opposite last page.



High-purity petrochemical products assured by advances in gas chromatography

Permits production of materials so pure they alter scientific standards of measurement

Greater purity — to a degree heretofore unattainable —is being assured in a widening range of petrochemical and petroleum products by advances in the science of gas chromatography, Gulf Oil Research Laboratories reports.

So far-reaching are these advances that they are altering, toward greater exactness, the very purity standards of the Laboratory. In industry, they are expected to clarify knowledge of the composition of many materials, and to result in purer products more exactly tailored for their intended uses.

Advances

The two basic improvements in gas chromatography are:

1) Sharpening the accuracy of this science so that it can detect, and isolate for examination by other devices, impurities measuring less than 1/100th of one percent in a drop of liquid.

2) Extension of its application from materials with low boiling points (140°F or less) up in the neighborhood of 750°F, greatly broadening its usefulness into the field of more viscous products.

Precise detecting devices,

Scientist changing minute sample of liquid into gas chromatograph for complete analysis of components

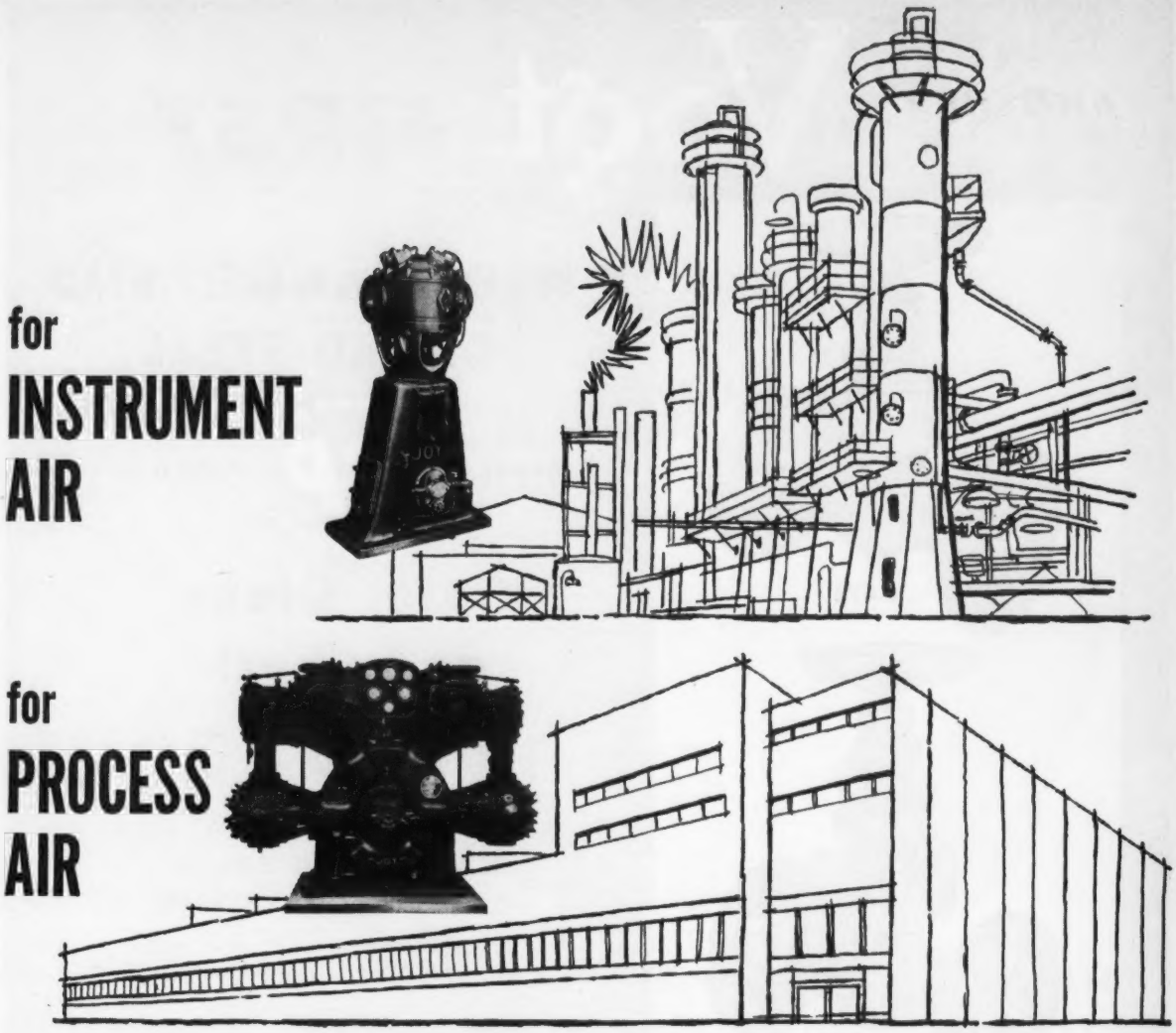
such as thermal conductivity cells, ionization gages and low voltage discharge tubes, now differentiate more accurately between the different components as they leave the tube. Sharpness of separation also has been greatly increased by adjustments in tubes and packing materials.

New techniques for trapping any component, in liquid nitrogen traps at −320°F, permit trace contaminants to be removed and then identified by such processes as mass and infrared spectrometry. Impurities whose presence was not even indicated by methods in use three years ago can now be separated and identified in this manner.

Drop of sample adequate for complete chromatographic analysis in comparison to the head of an ordinary pin

Finally, the extension of the technique to materials with higher boiling points makes it applicable to petrochemicals, waxes, greases, and heavy oils. Outside the petroleum industry, applications are now seen practical for controlling purity of some foods and drugs, studying fats, blood content and other body components and determining residual insecticide sprays left on vegetables.

Importance of these developments lies in the fact that presence of a contaminant in



JOY OIL-FREE COMPRESSORS UP TO 15,000 HP

Air actuated instruments are reliable only if the compressed air is absolutely oil-free. That's why so many companies have chosen Joy WGO-9 compressors to power their pneumatic instruments. With capacities from 95 to 900 cfm, the WGO-9 is the dependable, economical way to produce clean, oil-free air for instruments.

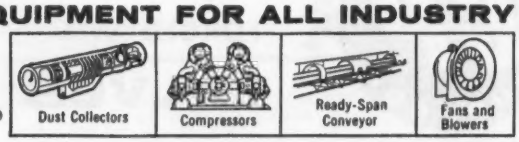
And if oil-free air is required in larger amounts for processes throughout the plant, Joy has a complete line of larger units. A special carbon-graphite piston ring design, patented by Joy, eliminates the need for lubrication in the cylinders. Even in the larger sizes, with capacities up to 4000 cfm, these rings give excellent service with operating life of 8000 hours and more.

Joy also makes a line of centrifugal and axial compressors for oil-free service up to 15,000 horsepower. If you have a need for clean, dry oil-free air, talk to a Joy engineer.

DATA
For complete information on Joy oil-free compressors, write for bulletin 330-80.

17640-330

AIR MOVING EQUIPMENT FOR ALL INDUSTRY



JOY

Joy Manufacturing Company
Oliver Building, Pittsburgh 22, Pa.

In Canada: Joy Manufacturing Company (Canada) Limited, Galt, Ontario

Check 3431 opposite last page.

Vogt FIRST

2 NEW FLANGED END FORGED STEEL

GENERAL GP PURPOSE

Gate, Globe and Check VALVES

with HARD FACED SEATS 150, 300 and 600 ASA STANDARD

featuring:

ASA Standard flanges and face-to-face dimensions

"Stellite hard faced seats and hardened wedges and discs

Spiral wound body-bonnet gaskets

Stainless steel gland studs and nuts

Interchangeable parts

Light weight with maximum strength

Complete line—pressures, sizes and types

*Union Carbide Corp.

GATE

GLOBE

CHECK

Vogt GENERAL GP PURPOSE Vogt FOR BETTER VALVES

HENRY VOGT MACHINE CO., BOX 1918, LOUISVILLE 1, KY.

SALES OFFICES: New York, Chicago, Cleveland, Dallas, Camden, N. J. St. Louis, Charleston, W. Va., Cincinnati

Vogt FORGED STEEL VALVES

Check 3432 opposite last page.

less than 1/1000th percent concentration can frequently spell success or failure of a product under modern requirements. For instance, factors such as color and odor can sometimes only be controlled as a result of gas chromatography studies.

"Ninety-nine and a fraction percent purity is no longer enough in many processes today," comments one Gulf scientist. "Purity has to be just about 100% without qualification for an increasing number of uses."

Case History

One such problem solved by the Laboratory, using the chromatography unit known as the Partitioner, involved a tiny industrial valve that kept clogging due to deposits. Six hundred valves had to be chemically cleaned to produce a measurable sample of the deposit, amounting to only one thousandth of a drop. This proved enough, however, to identify and eliminate the contaminant from the liquid handled by the valve.

Of major importance is the application of the improved gas chromatography to assure near total purity of petrochemical products which the company supplies to industry. Another particular project in which the technique is being applied is the company's part in the national study of automobile exhaust gases with the aim of controlling them better.

Not only do chromatographic techniques provide a more accurate analytical tool, but also liquids and gases can be analyzed much more rapidly as compared to more conventional methods of distillation. The installation of Partitioners in Gulf's refineries has resulted in the ability to increase the frequency of analysis of refinery streams by this more accurate technique, thus improving the quality and increasing the uniformity of Gulf's fuels, lubricants and petrochemicals.

Gulf is in the forefront, but far from alone, in its development work in this field. The Company's scientists,

however, take a particular interest in it because they were instrumental in the development of one of the first standardized American machines for gas chromatography, the Fisher-Gulf Partitioner.

(For further information on Fisher-Gulf Partitioner contact Fisher Scientific Co., 717 Forbes St., Pittsburgh 19, Pennsylvania.)

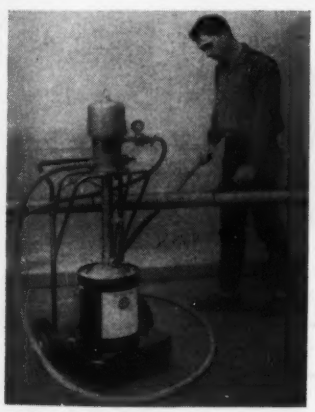
Check 3433 opposite last page.

Heat-transfer cement easily installed with nozzles

Uses: Provide single-pass uniform installation of heat-transfer cement over steam tracers on pipelines and vessels.

Features: Cement installation labor costs are reduced. Uniform coverage is provided and voids are eliminated, thus providing better overall heat-transfer characteristics.

Description: Nozzles are available for either pneumatic



Nozzles can be used with pneumatic-operated pump to apply heat-transfer cement

pump or hand gun. Pneumatic-pump application rate is 600 to 800 ft/hr (including container changing time.)

Hand-gun application rate is 150 to 200 ft/hr. (This includes gun refilling time.)

(Thermonizing nozzles are product of Thermon Manufacturing Company, 1017 Rosine St., Houston, Tex.)

Check 3434 opposite last page.

YARDSTICKS FOR GASKET PERFORMANCE

The No. 1 reason for specifying Flexitallic Spiral-Wound Gaskets is predictable performance. The compression characteristics of each Flexitallic Gasket are always related to the pressure/temperature ratings of the flange. They are made for each other.

But, beyond this, engineers know that Flexitallic Spiral-Wound Gaskets give important advantages such as:

- Wet or dry, there is no change in the compression characteristics of a Flexitallic Spiral-Wound Gasket.
- In Style CG Flexitallic Gaskets, the standard ring completely seals the flange with steel, and gives positive indication of effective bolt load.
- The Flexitallic Spiral-Wound construction gives the safest possible seal for flammable or toxic fluids.

Flexitallic Blue, the blue-dyed Canadian asbestos filler, identifies the original Spiral-Wound Gasket construction.

FLEXITALLIC GASKET CO.
8th & Bailey Sts. Camden 2, N.J.

Flexitallic®
SPIRAL-WOUND GASKETS

FOR PIPE FLANGES, PRESSURE VESSELS AND PROCESS EQUIPMENT

*Flexitallic is a registered tradename. No one else can make a Flexitallic Gasket. Look for *Flexitallic Blue* — it's our exclusive blue-dyed Canadian asbestos filler.

Check 3435 opposite last page.

Largest Merchant Iron Producer in U. S. Chooses

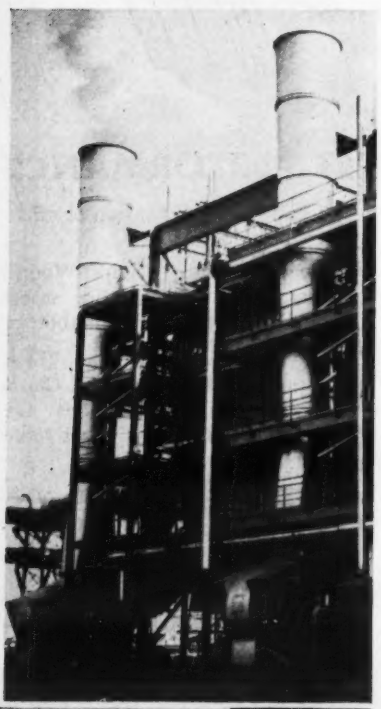
WHIRLEX ID FANS

High Erosion Resistant Fan Wheel Assures Longer Life . . . Minimum Maintenance

The largest furnace in the country producing merchant pig iron was recently placed in service as part of an expansion program by a major Southern mill. The new furnace has a rated capacity of 1000 tons per day and is one of the most modern in the country with respect to mechanization and automatic controls.

Because of their unique design and high erosive resistance, WHIRLEX heavy duty draft fans were chosen to handle the hot blast furnace gas. The three units shown here carry approximately 150,000 cubic feet of gas per minute. Preliminary fan examinations show wear to be less than a third that of ordinary fans designed for this purpose.

A Whirlex fan installation may solve your problem. Write or wire us.



Fly Ash Arrestor Corp.
200 N. 1st Street
BIRMINGHAM, ALA.

WHIRLEX

Check 3436 opposite last page.

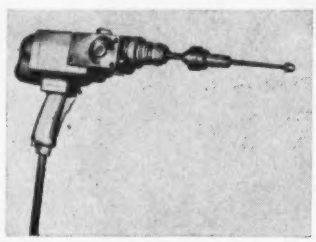
PETROCHEMICALS

Automatic tube expander cuts operation time by one-third

Problem: Manual tube expansion was found to lack precise accuracy necessary in rolling joints for heat exchanger, used to recover gas in a process at Gas Equipment Engineering Co. of Mt. Vernon, New York. Tube is 18-gage 5/8" steel.

Solution: Air-driven automatic tube-expander drive was employed in operation. Unit automatically stops rotation of expander at predetermined tightness. This is preset by means of calibrated dial, reading torque in ft-lb.

Drive unit registers torque at output spindle. It senses reading regardless of tube sheet hole or tube wall variations.



Air-driven automatic tube expander drive and control has virtually eliminated expander breakage in heat exchanger application

Torque control is independent of air motor. Its lubrication is permanent. Oil reservoir is built into handle control for lubrication of air motor proper.

Results: In addition to providing precise accuracy needed, unit has reduced tube expansion time by one-third. Expander breakage has been virtually eliminated.

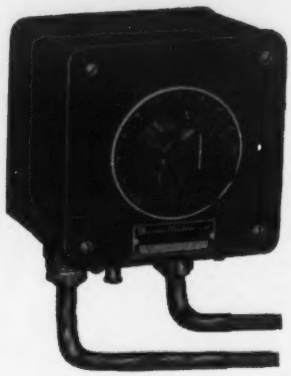
(Model B Torq-Air-Matic is product of Thomas C. Wilson, Inc., 21-11 44th Ave., Long Island City, N.Y.)

Check 3437 opposite last page.

Check valves are outlined in single-sheet Circular 588—Lunkenheimer Co., Beekman St. at Waverly Ave., Cincinnati 14, Ohio.

Check 3438 opposite last page.

Rotary Selector Switches Are Fast, Convenient



For Thermocouples Or Resistance Bulbs

Expertly engineered and ruggedly constructed, T-E's Rotary Selector Switches combine speed and convenience with trouble-free performance. Use them for frequent checking of temperature measuring circuits, for switching circuits from one instrument to another, or for connecting one instrument to a number of measuring points. They'll operate with millivoltmeter or potentiometer-type pyrometers, and with resistance bulb thermometers. Contacts and wipers of the same silver alloy eliminate possible false voltages from thermoelectric action. Three models offer capacities of OFF to 6, 12 or 24 points.

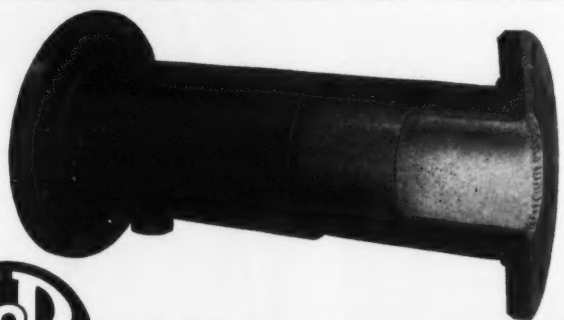
Other Types

For equal dependability and convenience, investigate T-E's wide variety of key and push-button selector switches—and quick-coupling connectors and panels.

Write for Bulletin 24-WS-R

Thermo Electric Co., Inc.
SADDLE BROOK, NEW JERSEY
In Canada—THERMO ELECTRIC (Canada) Ltd., Brampton, Ont.

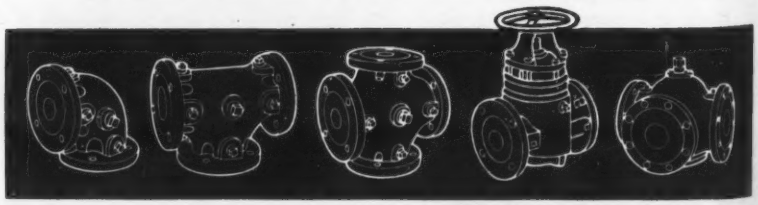
Check 3439 opposite last page.



H&B JACKETED PIPE and FITTINGS

● The above cutaway illustrates H & B standard jacketed welded pipe and fitting construction, designed to allow complete jacketing of the product pipe. Special jigs and fixtures enable H & B to insure complete uniformity of the jacket area in relation to the O D of the product line and the I D of the jacket pipe. All H & B jacketed equipment is hydrostatically tested at 450 to 500 p.s.i. H & B welded steel jacketed fittings are ideally suited for process piping of pressures reaching 300 p.s.i. and temperatures up to 750°F. . . . A few of these fittings and valves are illustrated below. For more information send for bulletin J-57.

HETHERINGTON & BERNER INC. • 715 KENTUCKY AVE., INDIANAPOLIS 7, IND.



Check 3440 opposite last page.

Scraped-surface chiller flushes fast when changing products or colors, cuts solvent needs and product loss drastically as it . . .

Speeds Cold-filling of Aerosols

DANA B. BERG, Managing Editor
with **PAUL S. PETERSON,** Vice President
DeMert & Dougherty, Inc.

Problem: Between-product flushing of shell-and-tube heat exchanger on aerosol cold-filling line at DeMert & Dougherty, Inc., Chicago, Ill., was costly and time-consuming. Anywhere from 50 to 150 gal of aromatic solvent and up to 45 minutes time were required, depending on products and colors involved in the switch. Flush was usually done several times a day.

Of course all of the product held up in the over 400-lineal-foot, 100-sq-ft-surface exchanger—sometimes as much as 15 gal—was lost in flushing, too. But even with the frequent flushing, certain products tended to build up on inside walls of tubes, thereby reducing heat-transfer efficiency and flow through unit.

Company packages several hundred aerosol products, some by cold-filling and some by presure-filling. Examples: paints, enamels, insecticides, room deodorants. Products to be cold-filled are chilled to 0° F prior to filling so they won't flash the chilled Freon propellant when it is run into the container.

Solution: In April 1958, DeMert & Dougherty started to use a Votator scraped-surface heat exchanger for this operation. Unit is jacketed for ammonia refrigerant. Product is pumped through the chilling tube while floating scraper blades continuously revolve to keep inside surface clean.

Temperature of product leaving exchanger is controlled by automatic setting of back-presure valve in refrigerant system.

Chilled product goes direct to Mojonnier Electro-Matic filling machine with eight filling heads, four above each of two parallel lines. Refrigerated Freon propellant is filled by similar machine down the line. The double line operates at 120 containers/minute, on 2- to 16-oz containers.

Results: New heat-exchange setup, with only nine sq ft of surface, does same job as old setup with 100 sq ft. Since the Votator chiller holds only one gal of product, flushing is much faster and there is much less loss of product and cleaning solvent.

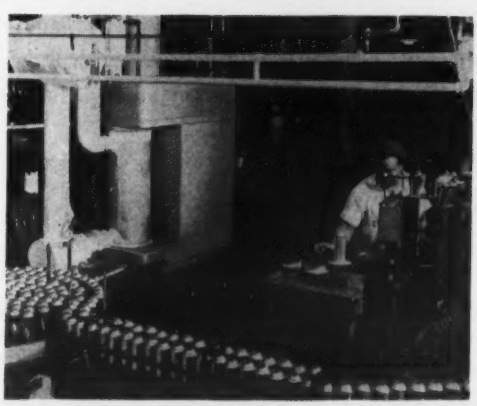
Now, flush can be done in 15-20 minutes (vs. 45 minutes before), using only 5-10 gal solvent (vs. 50-150), and losing only one gal product (vs. as much as 15 before).

Rotating scrapers of exchanger prevent build-up of product on wall, assuring top cooling efficiency. They also aid in keeping paint thoroughly mixed during the chilling step.

(Votator heat exchanger was made by Girdler Process Equipment Division of Chemetron Corporation, 334 E. Broadway, Louisville 1, Ky.)

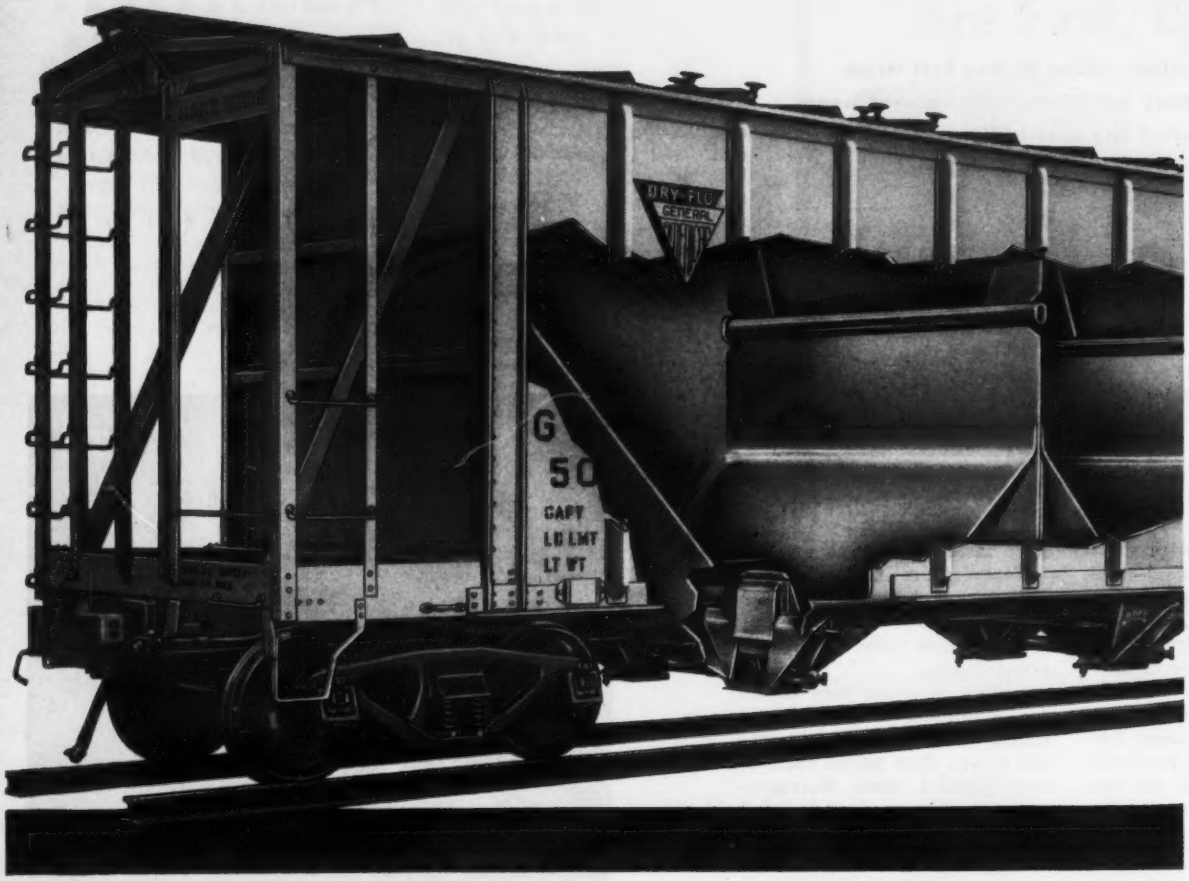
Check 3441 opposite last page.

Aerosol cold-filling line at DeMert & Dougherty handles 120 containers/minute



Ammonia-jacketed scraped-surface heat exchanger, in background, chills product for cold-filling line

smooth interiors of DRY-FLO* CAR



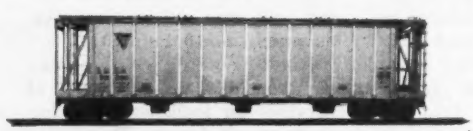
eliminate hangup points!

• Exterior carlines make possible a smooth ceiling. Hopper corners are rounded to a 2½" radius to allow perfect discharge of lading.

• You can unload the DRY-FLO car pneumatically or mechanically. Greater clearance above rails accommodates all types of unloading equipment at rail siding or team track.

• All-welded construction makes application of interior coating easy when needed.

Competitive in price with other covered-hopper cars! do so much more!



*Patent Rights Reserved

DRY-FLO CAR DEPARTMENT
GENERAL AMERICAN TRANSPORTATION CORPORATION
135 South LaSalle Street • Chicago 90, Illinois
In Canada: Canadian General Transit Co., Ltd., Montreal
Offices in principal cities

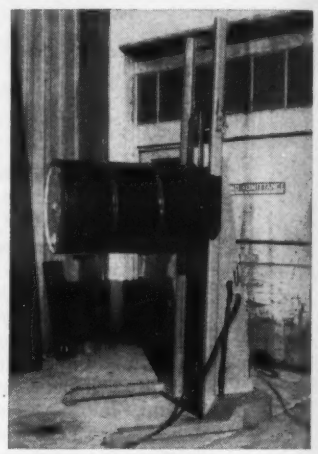
Check 3442 opposite last page.

Mobile elevator used with side- or end-entry drum racks

Gives 90" lift but passes through 6½' doorway

Uses: Elevator may be used for loading and unloading either side-entry or end-entry drum racks.

Features: Hinged extension lift at top of unit gives lifting height of 90" when needed, but permits passage through standard 6½' doorways at non-extended lifting height of 55".



Hinged extension atop elevator extends 55" lift to 90"

Description: Drum can be picked up by moving forks parallel along length of drum . . . or drum can be rolled sideways up sloping ends of forks until it reaches shallow grooves which stabilize it on platform.

Elevator in photo was equipped with explosion-proof motor and controls since solvents are in the drums.

(Portable drum-handling elevator is product of West Bend Equipment Corporation, West Bend, Wisconsin.)

Check 3443 opposite last page.

For more information on developments reported in this section, check corresponding numbers on Reader Service Slip opposite last page of this issue.

GAYLORD Gives
Your Packaging a Lift

Let Gaylord lighten your load when you come to weighty packaging decisions. A nearby Gaylord man will analyze your entire packaging program . . . help you tone up the weakling containers . . . tone down the muscle-bound.

For tough corrugated boxes that deliver better protection, better promotion, better profit . . . put the weight on that experienced box-builder—your G-man. He's ready, now.

GAYLORD
CONTAINER CORPORATION

Gaylord Boxes

HEADQUARTERS, ST. LOUIS
PLANTS COAST TO COAST

DIVISION OF **Crown Zellerbach Corporation**

For more information on product at right, specify 3444 see information request blank opposite last page.

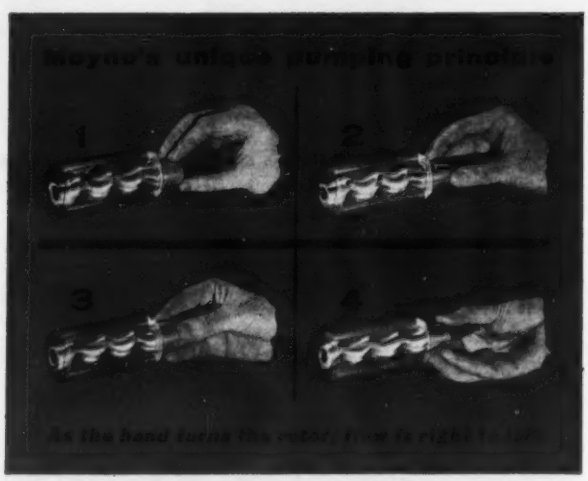
MOYNO®
CHEMICAL PUMPS

MOYNO® Progressing Cavity Pumps Handle Chemicals that *Ruin Other Pumps!*

MOYNO's unique *"progressing cavity"* principle and special resistant internal parts slash pump maintenance costs on problem chemicals that ruin other pumps. Any chemical that can be forced through a pipe—from thin watery slurry to extremely viscous rubber dough—can be pumped with a MOYNO.

As illustrated at right and in the cutaway model above, a rugged screw-like rotor turning inside a double-threaded stator forms *"progressing cavities"* which move chemicals smoothly. Fluids are pumped without turbulence, agitation or pulsation, and discharged uniformly. Rotor and stator materials resist abrasion and corrosion. Hundreds of difficult chemicals successfully handled prove that MOYNOS show little wear, even after long service. They have increased production and greatly lowered downtime on many jobs where they replaced other type pumps which had run up prohibitive maintenance costs or failed completely. On other jobs, MOYNOS have succeeded where chemicals were formerly moved by hand or other expensive means because they were considered unpumpable.

MOYNOS are available in capacities up to 500 gpm; pressures up to 1000 psi. Off-the-shelf replacement parts are always immediately available. To find out how you can decrease chemical pumping costs, write today for Bulletin 40 CP



ROBBINS & MYERS, INC.
motors, household fans, Propellair industrial fans, hoists, Moyno industrial pumps
SPRINGFIELD, OHIO · BRANTFORD, ONTARIO

Check 3445 opposite last page.

Charger mounts on truck to provide recharging from wall outlets

Uses: Charges electric-powered truck batteries.

Features: Silicon-rectifier device with transistorized control unit rides on battery and is activated by plugging into 115v AC wall outlet, eliminating need to return truck to central charging station.

Description: Proper rate is maintained from start of cycle by fully automatic taper-rate charging system which modifies input as battery becomes more fully charged.

When battery is fully charged (16 hours or less), brain unit directs output to be reduced to low finish-charge rate that maintains full charge until truck is ready for use, and prevents damage to battery even if charger is left on over long weekend.

Battery voltage, charging current, and input-voltage variations are interpreted by transistors that control magnetic amplifier, an electrical valve which automatically varies charging current as needed and tapers off charge at proper rate.

Housed within steel case bolted to battery tray cover, components are cooled by convection. One type of case is 22 x 6 x 9". Cover is inch wider. Charger weighs 62 lb.

(Power Mount is distributed by Exide Industrial Division of The Electric Storage Battery Company, Rising Sun and Adams Ave., Philadelphia 20, Pennsylvania.)

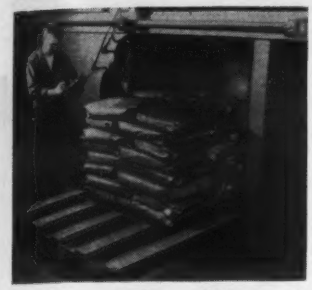
Check 3446 opposite last page.

Bags stacked by machine

Automatic controls handle the whole job

Uses: Automatic palletization of bags.

Features: No operator required. Each stage of positioning the patterns and stacking is automatically controlled—by either Westinghouse Cypak magnetic con-



Automatic bag palletizer

trol system or standard relay controls.

Description: Operating parts are: motor-driven roller table, elevator, and automatic ram. All reciprocating motions are designed to use full stroke of hydraulic cylinders. Thus there is no need for mechanical adjustment or electrical control of these elements.

Roller table accepts and positions bags. When a pattern is complete, table moves from under pattern and stacks it on elevator below. Elevator descends one position as each layer is added. Ram pushes completed stack off elevator, for pickup by fork truck, conveyor, or other means.

Standard models are about 7' high, required floor area of approximately 14 x 14'. Metal, paper, or wood pallets may be used.

(Automatic palletizer is development of Miller Engineering Corporation, 119-D E. Barbee Ave., Louisville, Ky.)

Check 3447 opposite last page.

Quick way to lag conveyor pulley

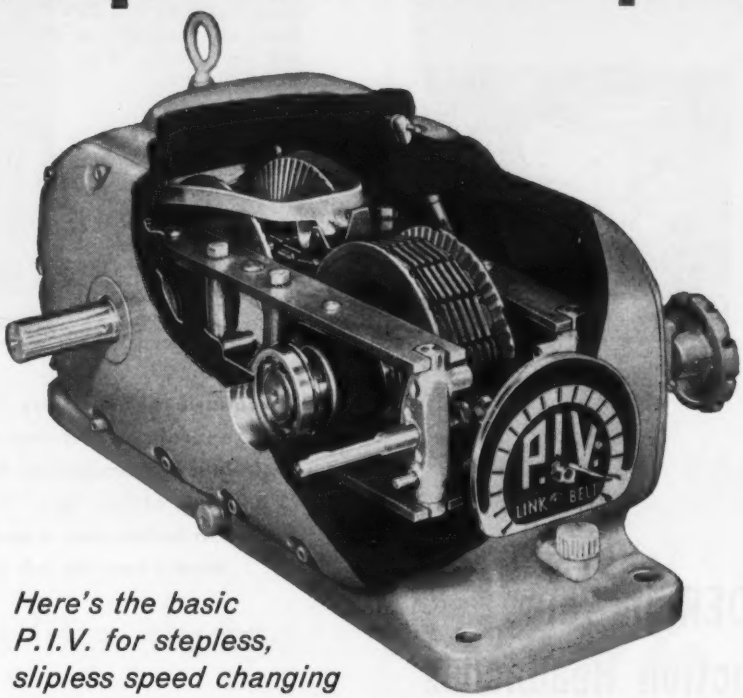
Thanks to recently developed kits, conveyor pulleys can be rubber-lagged without removing them from conveyor. Neoprene sheet of desired thickness is cold-bonded to steel pulley surface with an adhesive strength of 3700 psi. No special tools are needed. Pulley can be used right away.

(Lagging kits are product of General Splice Corp., 85 Spring St., South Norwalk, Conn.)

Check 3448 opposite last page.

LINK-BELT P.I.V. is available in all these ways for

super-sensitive quality control



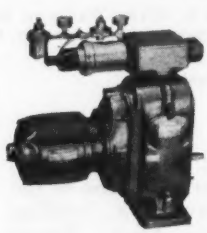
Here's the basic P.I.V. for stepless, slipless speed changing

Today a growing number of production machines and operations demand extremely accurate transmission of power with variable speed control. For these requirements, Link-Belt P.I.V. is available in the many ways shown below—with automatic controls and integral differential to satisfy an infinite number of variable speed applications.

Variable from top speed to minimum speed with no steps, no stops in between, Link-Belt P.I.V. is industry's only chain-driven variable speed drive. Teeth—not tension—permit positive, high-efficiency power transmission.

For information on the full P.I.V. line, call your nearest Link-Belt office or authorized stock-carrying distributor. Or write for Book 2274 on basic P.I.V., Book 2349 covering automatic controls and Book 2774 explaining P.I.V. with integral differential.

Link-Belt P.I.V. is available in 8 sizes and 16 standard types, in capacities from ½ to 25 hp—for horizontal or vertical mounting. Compact design simplifies installation as a separate unit or a built-in part of a machine. P.I.V. is totally enclosed, automatically lubricated.



PNEUMATIC (shown) — The P.I.V. pneumatic ratio changer is used as a final control element providing fully automatic control of speed. Operates from standard pneumatic controller in systems regulating pressure, temperature, rate of flow, etc.

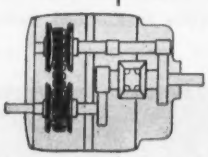
MECHANICAL — Predetermined timing, cyclic, or characterized regulation can be accomplished by P.I.V. with mechanical controls.

HYDRAULIC (shown) — Consists of a low-pressure hydraulic Servo system with a precision valve positioner. Intended to give automatic speed control by direct operation with any form of linkage. A minimum operating force is required.

ELECTRONIC — Flexible form of speed control to provide either "on-off" or modulated speed response of P.I.V. drive. Electric control motors are available to match a wide variety of electrical control systems.

P.I.V. with integral differential gearing

CONDENSED SPEED RANGE TYPE of integral differential results in a ratio range less than a standard P.I.V. with the advantage of increased horsepower capacity, high ratio stability and accuracy. These drives are applicable wherever small ratio range is required but with extreme accuracy of ratio control.

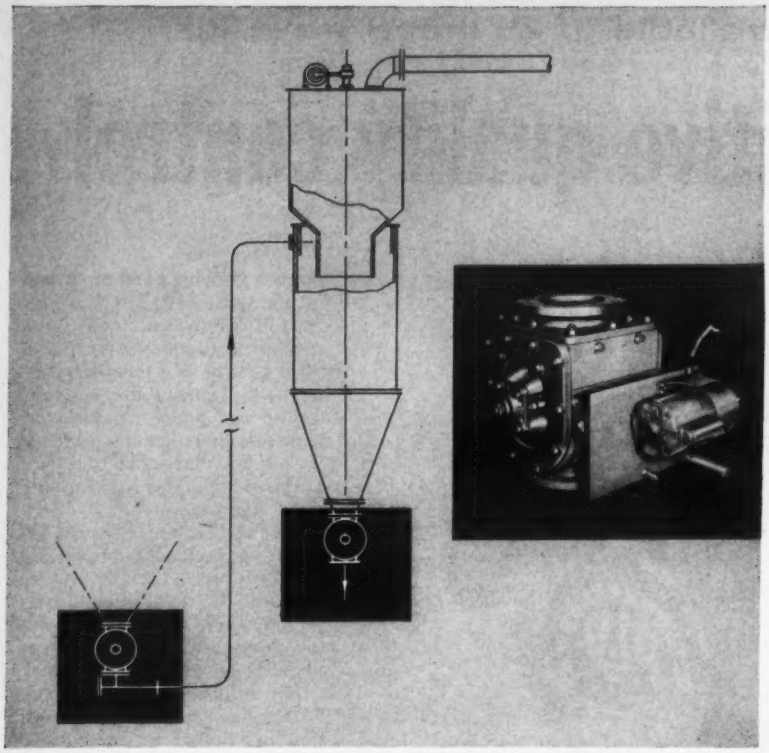


EXTENDED SPEED RANGE TYPE of integral differential results in infinite ratio range and output speeds down to zero with a constant input speed. Clockwise and counterclockwise rotation through zero is also obtainable. These drives may be used whenever a ratio range greater than 6 to 1 is required.

LINK-BELT P.I.V. VARIABLE SPEED DRIVES

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants, Sales Offices and Stock Carrying Distributors in All Principal Cities. Export Office, New York 7; Australia, Marrickville (Sydney); Brazil, Sao Paulo; Canada, Scarboro (Toronto 13); South Africa, Springs. Representatives Throughout the World. 15,102

Check 3449 opposite last page.



Put This ROTARY FEEDER in Your System and End Production Headaches

Are you experiencing the *usual* headaches connected with the *usual* rotary feeder installation? Problems like . . .

- Irregular feed
- Flooding during feeding
- Leakage of feed, due to wear
- High maintenance costs
- Difficult and costly installation

Solving these problems is easy—just *specify an A-S-H Type "B" Rotary Feeder.*

The A-S-H Type "B" Rotary Feeder was engineered to meet your needs. Our exclusive rotor and shoe design guarantees positive feed without flooding, adjusts easily for wear and can be replaced without dismantling piping. Data Sheet DVc shows how this is done, and how the Type "B" will solve other rotary feeder headaches. Send for your copy today.

the **Allen-Sherman-Hoff** company

257 E. Lancaster Ave., Wynnewood, Pa.

Offices and representatives in principal cities

MATERIALS HANDLING EQUIPMENT

Check 3450 opposite last page.

Two Moyno pumps (bottom) are fed by tanks which supply the lime-like sludge waste from agitated tank (not shown) above them

Ground-level machinery could not operate on soft mud waste of lithium ore processing. But large amounts of this "goo" had to be distributed over a large area. Here's how the job was done

Problem: Solution:

DANA B. BERG, Managing Editor
with **BRODIE E. CRAWFORD,** Chief Engineer
Foote Mineral Company
Sunbright, Va.

Problem: Large amount of waste material in form of soft mud presented a handling problem to Foote Mineral Company, at Sunbright, Va., plant. A lime-like sludge, which requires about 30 days to harden, is a by-product of lithium ore processing.

Foote Mineral needed a system which could distribute large amounts of this material over a large area. They wanted the material to harden fairly well in one spot before additional waste sludge was piled on.

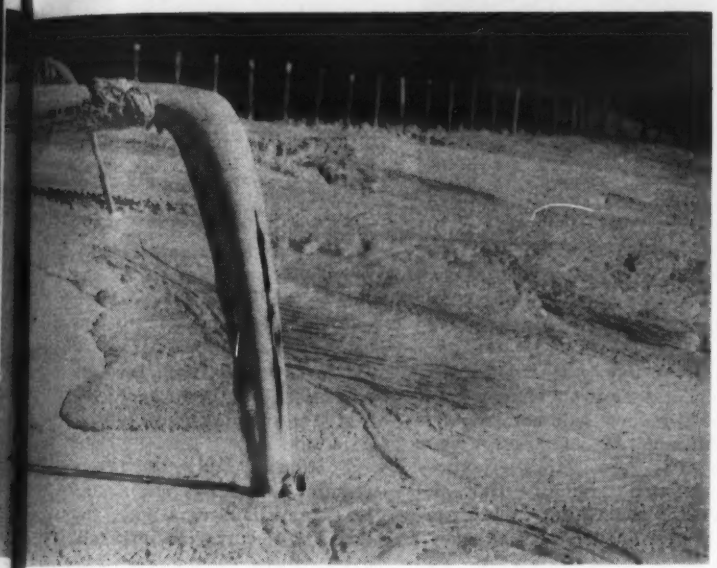
Soft, muddy character of the waste ruled out distribution by bulldozers or wheeled vehicles. Other usual methods proved too costly upon investigation.

Solution: Installing two 70-gpm progressing-cavity (Moyno) pumps, fed from a tank complete with agitation, Foote Mineral found that it could pump this near-concrete-like slurry without difficulty.

Tank is located at end of a conveyor line. The caked material, partially de-watered by a continuous filter, is dumped into tank, agitated, and pumped through two 4″ lines to point of disposal. No water is added here; since the sludge is thixothropic, agitation alone makes the material fluid enough to flow to pump.

Waste material is disposed of in a natural valley about 1000 feet long and several hundred feet wide. Area is full of sinkholes. Procedure is to pump through pipes into a sinkhole to a depth of 2″, permit material to harden into a cement-like mass, and then

Waste is pumped into sinkholes, where it hardens in about a month



Disposal of lime-like sludge Pump it into sinkholes

fill sinkhole completely. Pipes are then moved to another hole.

Sludge consists of dicalcium silicate, tricalcium aluminate, and calcium hydroxide. Foote Mineral considers that it may someday reclaim the material for the actual making of cement. (See box.)

Results: Foote Mineral considers the installation is completely successful. The objective of the installation was to make the waste disposal operation as simple as possible. One man can now handle it.

During 1½ years of operation, maintenance of the pumps and lines has been reasonable, and the convenience has been all that could be desired.

(Moyno progressing-cavity pump is product of Moyno Pump Division, Robbins & Myers, Inc., 1345 Lagonda Ave., Springfield 9, Ohio.)

Check 3451 opposite last page.

Uses Proposed for Waste

Foote Mineral is now investigating use of the waste described here in manufacture of a masonry paint and an extender for Portland cement. Concrete blocks containing about 10% of the spod-lime residue tested a higher compression strength than did standard blocks, both at the end of seven days and 28 days.

Thus a former waste product may well become a saleable by-product.

SAVE UP TO
$1500.00!
You can get a Case W-5 with 1-cu. yd. bucket for $5975, F.O.B. factory, plus freight and taxes. Price subject to change without notice.

GET 73% MORE BREAKOUT
for faster cycles with new
CASE® W-5 Terraload'r

You not only save up to $1500.00 in capital investment . . . you also gain more work output per dollar with the new high-speed, 3000-lb. capacity Case W-5 Terraload'r.

Unique combination of parallel hydraulic circuit, 30 gpm pump, and special tilt linkage gives the W-5 a breakaway force of *7800 lbs.* — 73% more than any competitive machine in its class. Result: operators get heaped loads faster, without "working" the bucket . . . save valuable seconds in every cycle. In addition, the W-5 gives you:

Faster maneuvering, with power-actuated forward-reverse shuttle shift, plus front-wheel-drive and rear-wheel power-steer — turns in 10'4" radius.

Better balance, with 24.2% more empty weight on rear wheels, for carrying heaped loads at higher speeds.

More power and efficiency, with heavy-duty Case-built gasoline engine, plus torque-converter drive.

For more information on the new W-5, call your nearby Case Industrial Dealer, or write us direct. Remember, too, Case also builds a larger 6000-lb. capacity 4-wheel-drive Terraload'r, as well as *crawler*-mounted loaders, from ⅝ to 2-cu. yd. capacity to meet your most exacting requirements.

CASE®

J. I. CASE COMPANY
Dept. H1549, RACINE, WIS.

C-TL-313C

Check 3452 oposite last page.

NEW FROM CONTINENTAL

Electrically welded, leakproof **flaring pails**

nest to save storage and shipping costs

9,000 vs. 3,000
A boxcar holds 3 times as many flaring as straight-sided pails. Same 5-gal. capacity!
SINGLE ELECTRICALLY WELDED SEAM

Single seam construction

gives leakproof protection for hard-to-hold products

These pails offer greater strength and protection for liquid roofing cements, paint and petroleum products, dry or powdered materials. Ask your Continental man for details.

CONTINENTAL CAN COMPANY

Eastern Division: 100 E. 42nd Street, New York 17
Central Division: 135 So. La Salle St., Chicago 3
Pacific Division: Russ Building, San Francisco 4
Canadian Division: 790 Bay St., Toronto, Ont.
Cuban Office: Apartado #1709, Havana

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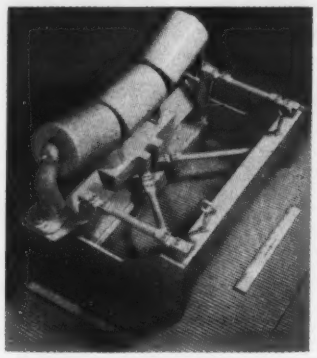


Continuous totalization

. . . of vertical weight displacements from standard flat or troughed belt conveyors is function of electronic scale which features a flexure-wishbone assembly that restrains scale idler in horizontal movement.

High system accuracy and near-perfect static hysteresis record are reported. Adapts to existing equipment, mounting between strands of conveyors 14 to 72″ wide. Electrical transducer converts weight into proportional voltages for continuous integration and digital display.

(Electronic conveyor scale is product of Bell Automation Corporation, 125 College Ave., Rochester 7, N.Y.)

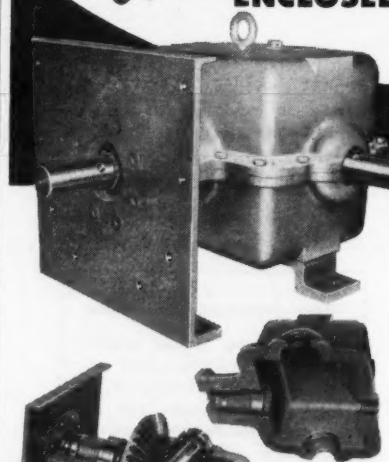
Check 3454 opposite last page.

Bin-level indicator resists corrosion

Uses: Automatically indicates level of light or heavy materials in bins, chutes, hoppers, and silos.

Features: Body of heavy aluminum castings and stainless steel diaphragm make indicator corrosion resistant even when enveloped with material. Spring-loaded diaphragm and sensitive switch

ADVANCED DESIGN
dreadnaught
ENCLOSED COUNTERSHAFT ENDS . . .
FOR SCREW CONVEYOR POWER TRANSMISSION



Stock units 6″ to 20″ screw conveyor with every possible shaft size. Each moving part readily accessible. Splash lubricated. Positive oil seals and rotating dust excluder. Thrust absorbed either direction. Operates horizontally or inclined.

● MADE IN 1:1 AND 2:1 RATIOS

SOUTHWESTERN SUPPLY and MACHINE WORKS
OKLAHOMA CITY, OKLAHOMA

ESPECIALLY DESIGNED FOR THE TOUGHEST INSTALLATIONS

Check 3455 opposite last page.

mechanism make it extremely responsive to changes in pressure of materials whether light or dense, coarse or abrasive.

Description: Unit may be affixed to thick- or thin-wall bins, or suspended within storage facility. May be used in chutes and hoppers to prevent choke-ups, over-feeding, and damage to machinery. Material pressure against diaphragm actuates switch which operates signals, or which can be set to automatically stop or start filling equipment. Available in general-purpose and explosion-proof models.

(Auto-Bin-Dicator is product of Bin-Dicator Co., 13946-43 Kercheval, Detroit 15, Mich.)

Check 3456 opposite last page.

Scale's revolving chart saves tare-off time

An inner revolving chart on recently developed mobile platform scale provides faster tare-off than with the customary tare beam.

Scale, with 21 x 29" platform, has the inner revolving chart graduated 500 lb x ½ lb, and outer stationary chart graduated 100 lb x 1 lb. When container is placed on platform, its weight is indicated on outer chart. Inner chart is then revolved so its zero reading matches indicator. Container is then filled and the net weight read on inner chart.

At any stage, dial charts show both net and gross weight of container and contents.

(Scale was developed by Detecto Scales, Inc., 540 Park Ave., Brooklyn 5, N. Y.)

Check 3457 opposite last page.

NEXT MONTH

A continuous automatic checkweighing operation is saving $10,000/year for A. E. Staley Manufacturing Company. Detailed coverage of this installation will be presented in this section next month.

Need an oscillating conveyor now?

3 LINK-BELT types cover every need—all are immediately available from stock

Yes, Link-Belt makes a specific type of oscillating conveyor for every type of service.

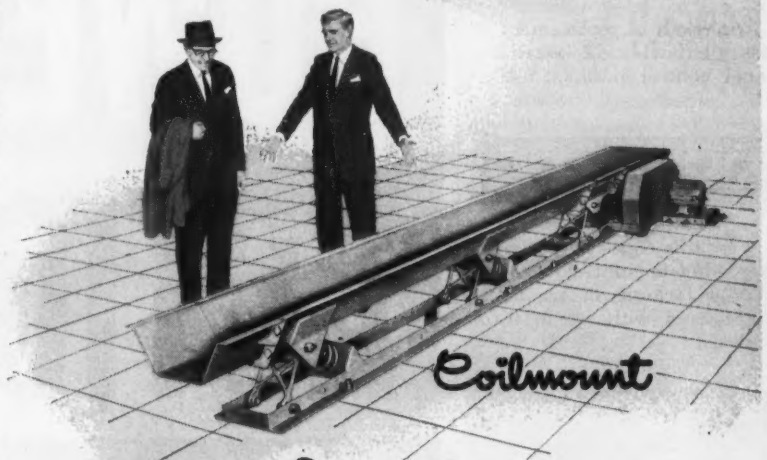
FLEXMOUNT for light-duty service. Ideal for gentle handling up to 25 TPH of 100-pounds-per-cubic-foot material. Widths of 8, 12 and 18 in.—all with 4-in. deep troughs. Flexmounts are pre-engineered — available from stock in 5- and 10-ft. sections.

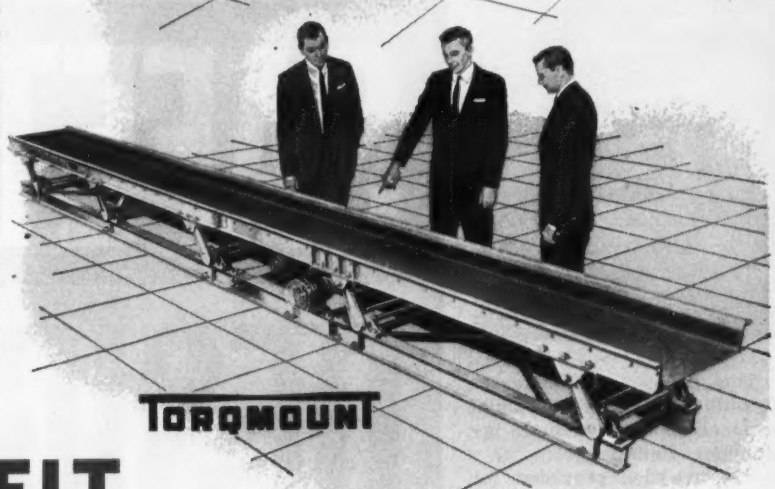
COILMOUNT for medium-duty service. For applications up to 80 TPH of 100-pounds-per-cubic-foot material. Widths of 10 and 20 in. with 6-in. deep troughs. Available from stock in completely assembled 5- and 10-foot sections.

TORQMOUNT for heavy-duty service. For severe service requirements on installations with capacities up to 350 TPH of 100-pounds-per-cubic-foot material. Widths up to 48 in. with 8-in. deep troughs. Popular 36-in. size stocked.

In every case, Link-Belt POSITIVE ACTION controls the load at all times . . . assures continuous, uniform flow of materials regardless of surges. And each type functions as near to NATURAL FREQUENCY as possible, minimizing power requirements.

For the best in light-, medium- or heavy-duty conveying, call your nearby Link-Belt office or authorized stock-carrying distributor. Or write for new Book 2744 containing complete data on all three types.





LINK-BELT

OSCILLATING CONVEYORS

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There are Link-Belt Plants, Sales Offices, Stock Carrying Factory Branch Stores and Distributors in All Principal Cities. Export Office, New York 7; Australia, Marrickville (Sydney); Brazil, Sao Paulo; Canada, Scarboro (Toronto 13); South Africa, Springs. Representatives Throughout the World. 15.121

Check 3458 opposite last page.

'New look' pail handle

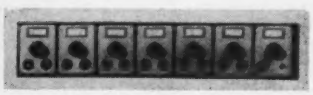
. . . is made of polyflexon with rounded corners and contour grip to fit snugly against pail, thus minimizing storage damage. Handles resist oils, greases, toxic materials; won't crack or sliver.

(Minim-Mar handles are product of Inland Steel Container Co., division of Inland Steel Co., 6532 S. Menard Ave., Chicago 38, Ill.)

Check 3459 opposite last page.

Batching operation efficiency increase

. . . is result of replacement of this 4-ft-wide 7-ingredient panel control unit . . .



. . . by this cigarette-package-size plug-in unit which can handle formula of up to 10 ingredients with up to three scales.

This development increases flexibility of batching units and eliminates manual ingredient dialing.

Formerly, provision for quick changes of formulas necessitated either presence of additional set of control panels or error-prone manual ingredient dialing. Now, such a change requires only removal of one plug-in unit and insertion of another.

Size reduction was made

THE INDUSTRIAL TRACTOR SHOVEL THAT

COMPARE POWER ACTION SAFETY DESIGN

COMPARE YALE FOR POWER, ACTION, SAFETY, DESIGN.

Industrial plants from coast to coast—in Canada and Latin America—have accepted the Yale Industrial Tractor Shovel as the pacesetter of the field. Compare Yale's exclusive features and you'll understand why.

ONLY YALE GIVES YOU MATCHED TORQUE TRANSMISSION!

72-hp. 6-cylinder engine provides smooth power through matched torque converter and Yale torque transmission (fully automatic). One-speed range forward—one-speed range back. Inching control for delicate close-quarter maneuvering. Extra punch for impact loading. Accelerates to 13 mph. in 5½ seconds.

ONLY YALE GIVES YOU A PERFORMANCE COMBINATION LIKE THIS!

2500-lb. carry capacity. Exclusive 45° bucket tipback permits faster loading and lowest carry position for faster transport with minimum spillage. 6' dumping clearance for dumping into bins and hoppers out of range of other—even larger—tractor shovels. Shortest turning radius—only 73".

ONLY YALE GIVES YOU BOTH THESE IMPORTANT SAFETY FEATURES!

Safety-curve lifting mechanism members never rise alongside the operator. Front and rear working lights give additional security.

ONLY YALE GIVES YOU THIS COMBINATION OF DESIGN FEATURES!

Rugged, simplified design! Sealed brakes and electrical system! Protected steering linkage! 10-ply tires! Whatever the job requirement—all these features add up to a more efficient performance at less cost—25% more work per hour. Full range of buckets and attachments available.

Leading companies throughout the country are productively using the Yale Industrial Tractor Shovel. Names on request.

For a demonstration in your plant or full data, contact your Yale representative. Or write The Yale & Towne Manufacturing Company, Yale Materials Handling Division, Philadelphia 15, Pennsylvania, Dept. YT-3V.

SETS NEW PERFORMANCE STANDARDS FOR INDUSTRY

YALE®
INDUSTRIAL LIFT TRUCKS
TRACTOR SHOVELS • HOISTS
YALE & TOWNE

Yale Materials Handling Division, a Division of The Yale & Towne Manufacturing Company.
Manufacturing Plants: Philadelphia, Pa., San Leandro, California, Forrest City, Arkansas.
Products: Gasoline, Electric, Diesel and LP-Gas Industrial Lift Trucks • Worksavers Warehousers • Hand Trucks • Industrial Tractor Shovels • Hand, Air and Electric Hoists

Check 3460 opposite last page.

possible by advances in design of high-resolution miniature electrical components. Plug-in control units can be preset for particular formula by means of adjustment screws, accessible behind sliding front panel of unit.

(Batchplug is product of The Howe Scale Co., Subsidiary of Safety Industries, Inc., Rutland, Vt.)

Check 3461 opposite last page.

Up to five tons weight on paper-veneer pallet

Save space by shipping flat and assembling on job

Uses: For handling of bagged materials.

Features: Expendable pallet's light weight (5 lb) cuts

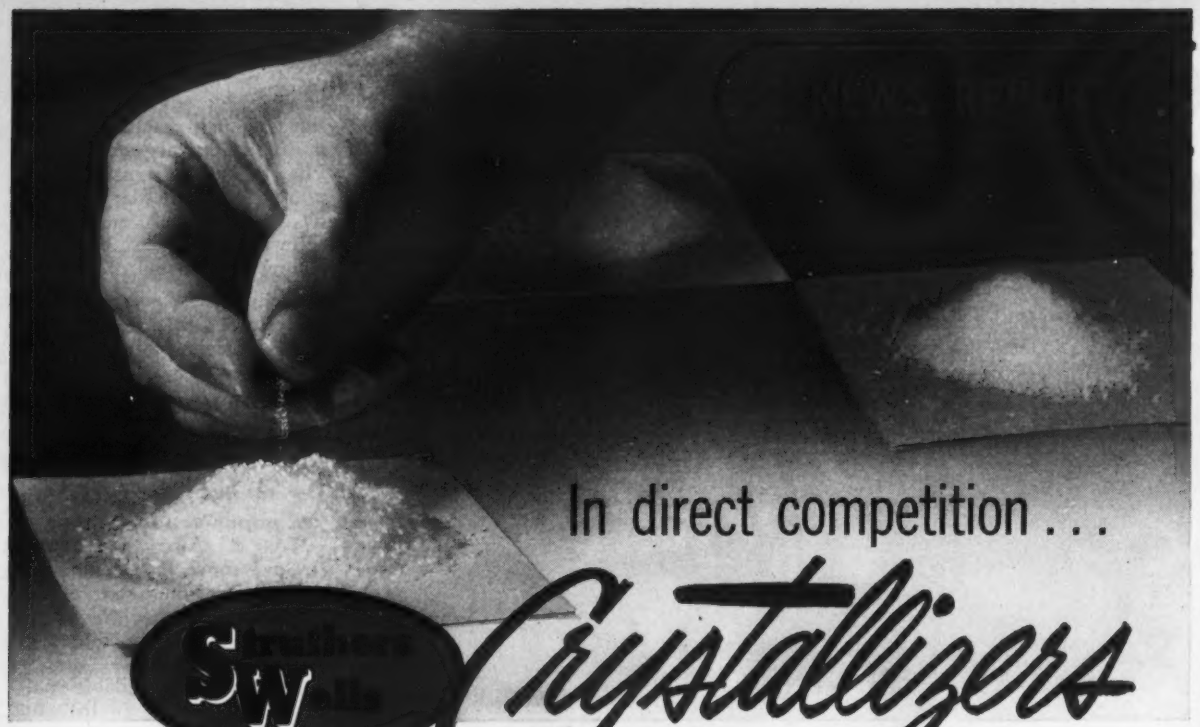
Expendable pallet in use. Up to 36 bags of cement weighing 3384 lb have been handled on pallet

freight costs. May be stacked three-high with bottom pallet carrying 10,152-lb load. Can be handled by standard lift trucks with standard forks up to 7" wide, 36" long on 26" centers.

Description: Made of 125-lb-test corrugated Kraft reinforced with ⅛"-wood veneer, pallets may be shipped flat and assembled at site by folding over opposite ends of 68 x 40" sheets to form channels for forks. Assembled pallets measure 36 x 40", carry 48 x 40" load.

(Sak-Pak pallet is product of Calco Supply Co., subsidiary of Calaveras Cement Company, 315 Montgomery St., San Francisco 4, Calif.)

Check 3462 opposite last page.



In direct competition . . .

Struthers Wells Crystallizers

LEAD in product quality
in operating economy

1. BETTER DEWATERING ON CENTRIFUGE OR FILTER
2. LOWER DRYING COST
3. ELIMINATION OF DUST LOSS
4. FREE-FLOWING, NON-CAKING PRODUCT
5. HIGH PURITY CHEMICAL
6. ADDED SALES APPEAL

Why do users who know prefer S-W Krystal® Crystallizers? The answer is uniformly sized, dust-free crystals, product purity, ease of centrifuging or drying, high recovery of mother liquor, effective operating economy and less downtime for cleaning.

If you make a crystalline product you owe it to yourself to investigate these advantages before you invest. Struthers Wells will gladly conduct a pilot study to assure you of the finest crystalline product at the lowest practical cost.

STRUTHERS WELLS PRODUCTS

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Crystallizers . . . Direct Fired Heaters . . . Evaporators . . . Heat Exchangers . . . Mixing and Blending Units . . . Quick Opening Doors . . . Special Carbon and Alloy Processing Vessels . . . Synthesis Converters

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BOILERS for Power and Heat . . . High and Low Pressure . . . Water Tube . . . Fire Tube . . . Package Units

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Crankshafts . . . Pressure Vessels . . . Hydraulic Cylinders . . . Shafting . . . Straightening and Back-up Rolls

WRITE **for the all-new descriptive bulletin Struthers Wells Krystal Crystallizers.**

® Krystal Registered U. S. Patent Office

STRUTHERS WELLS *Corporation*

WARREN, PA. Plants at Warren, Pa. and Titusville, Pa.

Offices in Principal Cities

Check 3463 opposite last page.

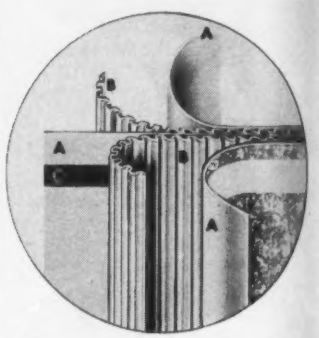
Railroad car linings replaced by two men in an hour

Prevent shop downtime by using carliner kits

Uses: For upgrading deteriorated linings of railroad freight cars.

Features: Easily installed with ordinary roofing nails by two men in less than hour.

Description: Packaged car kits consist of four corner posts, four end panels, and 16 side panels. Liner is comprised of two external corrugated sheets with ¾" steel straps embedded in them, and bonded to internal sheet of impregnated, puncture-resistant liner board.

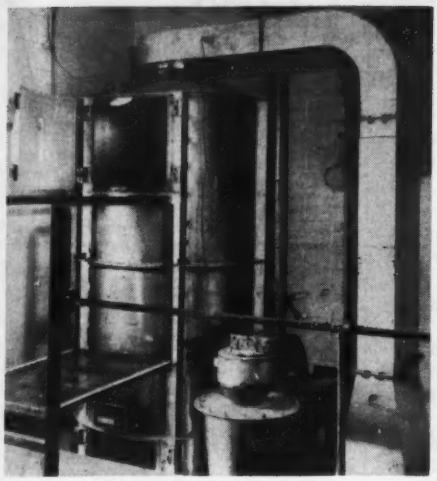


Construction of carliner: A) liner board; B) corrugated medium; C) steel straps embedded in corrugated medium

(Steel-Corr carliner is marketed by Ford Carliner Division, 116 North 40th St., Omaha 31, Nebr.)

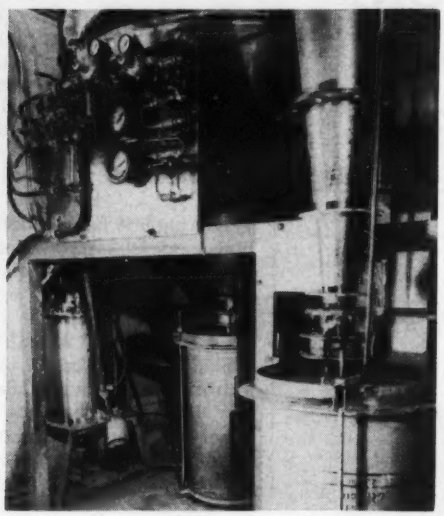
Check 3464 opposite last page.

"S-H-H-H. I got a bite!"



Upper portion of spray dryer which almost instantaneously converts barium titanate slurry into usable spherical particles. Unit is shown open for inspection

Cyclone collector in foreground serves as secondary collection unit for ceramics spray dryer. Primary collection takes place at base of dryer



Switching from conventional equipment to spray dryer has paid off in double dividends in this ceramics processing plant. Handling barium titanate slurry, unit . . .

• Slashes processing time 66%
• Yields rounder titanate fines

Problem: Processing barium titanate into fines suitable for pressing into ceramic products was a slow and tedious operation at Onondaga Pottery Company, Syracuse, New York. It took two men three days to mix, oven-dry, grind, and screen a single batch.

Physical form of the resultant fines also left much to be desired. Their jagged shape, diversity of grain sizes, and subsequent flow deficiency made further processing of final end product cumbersome.

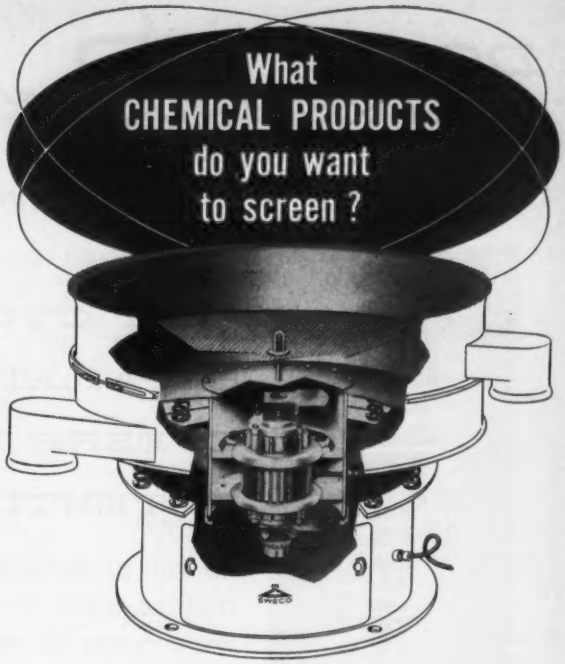
Because of its high dielectric constant and changes with temperatures, barium titanate is used in high-value capacitors and temperature-compensating elements. In addition to making electronic components, Onondaga produces world-famous Syracuse China.

Solution: To speed up production, the company installed a spray dryer to convert the mixed titanate slurry into fines. The mixed material, consisting of barium titanate, a binder, and a lubricant, is stored in two jacketed tanks prior to being fed to the dryer. Tanks are equipped with agitators to insure uniform composition during discharge.

Slurry is fed into dryer from tanks by means of 15-20 psi air pressure. Feed rate into dryer varies from 50 to 100 lb per hr, depending upon production requirements. Entering dryer, slurry passes through atomizing nozzle where it mixes with 60 psi, counter-current flowing air.

Resultant mist swirls through drying chamber, meeting 610°F, gas-heated, drying air. Desiccation occurs rapidly, the dried particles dropping to bottom of unit in less than a second. Discharge temperature is about 275°F.

A 10-hp exhaust fan draws dried product from dryer into the collection area. Primary collector is located directly below drying chamber. Secondary collection



You can screen them better with a SWECO Vibrating Screen Separator. More than 550 SWECO Separators are performing efficient screening operations today in chemical plants throughout the world. Advantages include: big capacity – clean separation – long screen life – low operating and upkeep cost. So, whether the chemical materials you wish to screen are wet or dry – coarse or fine – heavy or light, you should investigate the SWECO Separator now.

SEND FOR SCREENING DATA

Check the kind of screening application in which you're interested. If it isn't listed, add it in the space provided. We can send you specific information on your screening problem or one very similar.

☐ I'm interested in screening data on:

☐ Abrasives ☐ Fertilizers
☐ Adhesives ☐ Inorganic Chemicals
☐ Alkalies ☐ Minerals
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☐ Drugs & Medicines ☐ Salt

☐ Other _____

☐ Send new SWECO Separator Catalog
☐ Send bulletin on "Solids-Liquid Separation"
☐ I'd like a screening demonstration

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COMPANY _____

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SWECO

Southwestern Engineering Company

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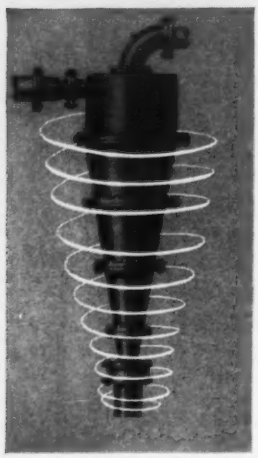
Engineers and Constructors . . . Manufacturers

Check 3465 opposite last page.

DORR-OLIVER POINTERS

A SERVICE TO THE PROCESSING INDUSTRIES



WET CYCLONE SEPARATION OFFERS WIDE POTENTIALITIES

Micron classification now possible in a wide range of materials of construction . . .

The idea of using centrifugal force to separate particles in a liquid medium has developed into a highly efficient classification technique. Applications now range all the way from handling the comparatively coarse, ¼ inch material found in coal and mineral preparation to the micron-size separations required in food, pharmaceutical and chemical processing.

These expanded potentialities are the result of a continuous development program carried out by Dorr-Oliver. One of the important discoveries of this research was that as the diameter of the cyclone is *decreased*, the fineness of classification is *increased*. With midget type DorrClones such as the one illustrated, classification in the 2 to 10 micron range is now standard practice. Even finer separations may now be obtained depending on the specific gravity of the materials handled.

Nesting a number of these units in common housings provides almost unlimited capacity. One extraction system employs 4,320 cyclones in nine compact housings.

Many of these multiple DorrClone Systems are now in operation for concentrating dilute starch slurries and sizing of materials such as pharmaceuticals, clays, talc and pigments.

Among the advantages of the wet cyclone are its extreme simplicity and its tremendous capacity for size. Often it can eliminate a more costly machine . . . or contribute real savings in space requirements. Materials of construction range from cast iron (with rubber or other linings, if required) to porcelain. Nylon or molded rubber blocks are commonly used in the miniature sizes, Kel-F, stainless steel and Stellite being available for special applications. Practically any abrasion or corrosion problem can thus be handled. Units have been manufactured to operate at pressures as high as 2500 psi. With units from 10 mm. to 24 inches in diameter, applications are as wide as industry itself.

If you have any kind of classification, clarification, or thickening problem, the wet cyclone technique certainly merits investigation. Maybe we have the answer you need. Dorr-Oliver Incorporated, Stamford, Conn.

DorrClone T.M. Reg. U.S. Pat. Off.

Dorr-Oliver offers a wide range of equipment, methods and complete systems for the processing industries. Operations include:

ROASTING • DRYING • CALCINATION • CLASSIFICATION • THICKENING • SCREENING • FILTRATION • CLARIFICATION • WASHING • AGITATION • CENTRIFUGATION • ION EXCHANGE • PUMPING

Check 3466 opposite last page.

is achieved by means of an auxiliary cyclone.

Dryer is constructed of stainless steel at all contact points to preclude contamination to material being processed. The metal also guards against wear and corrosion to unit itself. Inner chamber wall is also made of stainless.

Results: Processing that used to take three days is now accomplished in one day — a savings of 66 percent. Only one man is needed part time to operate the dryer, thereby releasing the other man for duty elsewhere in plant.

The biggest benefit obtained however, is improvement in the shape of the barium titanate fines. Over 90 percent of the dried product is in the form of spherical fines. This is considered to be a major achievement, overshadowing all the other benefits. The spherical shape enhances the flow properties of the fines and results in easier and improved pressing. The grinding operation has also been bypassed, since the spherical particles are all in the desired size range.

The company estimates that the changeover to the spray dryer amortized itself within 15 months. No major operational problems have been encountered. At full production, the dryer operates two shifts a week. It takes about one half to one hour to bring the unit up to operating temperature. To speed shutdown, slurry line is flushed out with warm water immediately upon completion of batch. Maintenance and cleanout operations are conducted at regular intervals.

(Ceramics spray dryer was produced by Bowen Engineering Inc., North Branch, New Jersey.)

Check 3467 opposite last page.

Air-treatment equipment, including units for air filtering, cooling, heating, cleaning, moving, and humidifying and/or dehumidifying, is depicted in 16-page Bul 518—Department PD, American Air Filter Company, Inc., 215 Central Ave., Louisville 8, Ky.

Check 3468 opposite last page.

Dependable, Low Cost

• GRINDING
• MIXING
• BLENDING

abbé
ENGINEERING
PEBBLE and BALL MILLS

NO SEPARATE MIXING

INCREASED CAPACITY

For quality-controlled, low cost dry or wet grinding, mixing or blending on a production basis, you'll find Abbé-Engineered Pebble and Ball Mills unequaled in production speed, operating cost and service life.

Abbé-Engineered Pebble and Ball Mills are available in a complete range of sizes from 40 to 13,000-lb. capacities.

Ask for quotation on Abbé "Non-Contaminating" Rubber-Lined Pebble Mills. Write for Abbé Mill Catalog No. 77

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620 E GRAYBAR BLDG., NEW YORK 17, N. Y.
Designers and Manufacturers of Ball, Pebble and Jar Mills • Pulverizers Sifters • Cutters • Mixers

Check 3469 opposite last page.

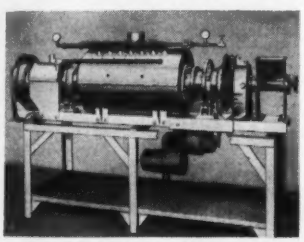
Midget calciner-cooler duplicates full-scale production conditions

Can be operated continuously with various products

Uses: Continuous heating and cooling of various materials in pilot plant or experimental-size batches.

Features: Unit is essentially a small version of a production-size machine. Equipment provides efficient way of producing samples of new products and obtaining processing data for full-scale production.

Description: Experimental, research-size, continuous rotary combination calciner and cooler is mounted on self-contained steel frame. Slope



Experimental-size calciner is capable of duplicating conditions that can be expected in full-size production unit

may be varied to control time of passage of material. Product can be heated to maximum of 2000°F. Material can be cooled to 150 — 200°F for discharge.

Screw feeder advances product from hopper into the cast alloy retort tube. Tube speed may be varied from 1 to 13 rpm, using a ¼-hp, 110-v, 60-cy AC transmission.

Refractory-lined furnace can be heated with either natural, manufactured or propane gas. Electrical heaters are also available.

Machines come in two sizes, 3½′ wide x 4′ high x 9′ long, when fitted with 7′ retort tube; or 14′2″ long when fitted with 11′2½″ tube.

(Experimental-size calciner is product of The C. O. Bartlett & Snow Company, 6200 Harvard Avenue, Cleveland 5, Ohio.)

Check 3470 opposite last page.

Some Straight Talk On Steam Trap Capacity

. . . or pulling away the curtain of confusion that surrounds steam trap capacity ratings.

Unfortunately, for the steam trap buyer, the subject of steam trap capacity has become cloudy and confused by a landslide of claims, counterclaims and inconsistent "standards" for measurement. So let's take a cold hard look at this subject so vital to the efficient operation of your plant.

What Determines Steam Trap Capacity?

There are three factors that determine the capacity of a steam trap:

1. The area of the orifice.
2. The density of the condensate.
3. The pressure differential across the trap.

Let's take a closer look at each of these:

Area of orifice is usually specified by the trap manufacturer or can be calculated from the diameter. Nothing complicated here.

Density of condensate depends on temperature. A cubic foot of cold water weighs 62.4 lbs. At 250° F. or 15 psi, it weighs less than 59 lbs. This is important. Don't overlook it.

Pressure differential across the trap is most significant. And it is complicated by the many factors that affect it, such as:

1. Pressure drop between unit drained and the trap when the trap valve is open.

2. Distance the trap valve is moved from the valve seat.

3. Back pressure on the trap with orifice closed; i.e., return header pressure.

4. Increase in back pressure produced by condensate and flash steam flowing in the discharge line. This in turn is affected by the diameter and length of the discharge line, plus friction caused by valves and fittings.

Orifice Capacity Vs. Steam Trap Capacity

Figure 1 shows a ½″ diameter sharp-edged orifice at the end of a pipe filled with cold water at 15 lbs. pressure. The capacity of this orifice, using a .61 coefficient of flow would be 8,800 lbs. per hr. Now, would this ½″ orifice if used in a ¾″ steam trap installed as shown in Figure 2 provide the trap with a continuous discharge capacity of 8,800 lbs. of hot condensate per hour? The answer is

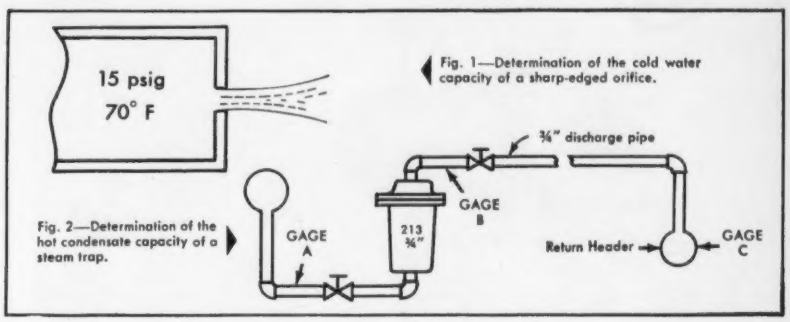


Fig. 1—Determination of the cold water capacity of a sharp-edged orifice.

Fig. 2—Determination of the hot condensate capacity of a steam trap.

"no". And here are some of the reasons why:

Density of condensate. As pointed out above, cold water weighs 62.4 lbs. per cu. ft. At 15 lbs. pressure and 250° F. water weighs less than 59 lbs. per cu. ft. This difference in density alone reduces the lbs. per hour capacity of the orifice by over 5%.

Pressure differential across the trap. With the trap valve closed we have a static pressure differential of 15 psi. The trap valve must be able to open against this pressure. However, this is not the pressure differential that will determine the capacity of the trap valve.

The ¾″ discharge line will be full of a mixture of flash steam and condensate. To keep this mixture flowing from the trap outlet to the return line requires a pressure differential. In actual capacity tests run as shown in Figure 2 Gage B at the trap outlet registered 11 lbs. back pressure. Thus the true pressure differential across the trap was about 4 lbs. Under these conditions the measured capacity of the trap was 4,340 lbs/hr. or just about half of the capacity of the ½″ orifice for cold water.

How Armstrong Determines Capacity Ratings

Armstrong trap capacity ratings are based on hundreds of tests under actual operating conditions. In these tests, the condensate used was at the steam temperature corresponding to the test pressure. Thus, the capacities determined take into account the pressure drop that occurs when the trap orifice opens and the choking effect and back pressure of the flash steam. Actual installation hook-ups were used so that pipe friction in both inlet and discharge lines as well was reflected in the results.

Let's go back to the example cited above and in Figure 2. The trap referred to is an Armstrong No. 213. While it did test out at 4,340 lbs. per hour for a static pressure differential of 15 psi, it is rated in the catalog at only 3900 lbs. per hour for this pressure—just to be on the safe side.

For the trap buyer, this means that Armstrong Steam Trap capacities are based on handling condensate at steam temperature for the stated static steam pressure differential under actual working conditions.

Capacity ratings which don't take into account all of the variables will be misleading and may lead to the selection of undersized traps. So whenever you specify or buy traps be sure that the capacity ratings you work from are realistic. One way to be sure is to select Armstrong Traps with *guaranteed* capacity ratings.

* * *

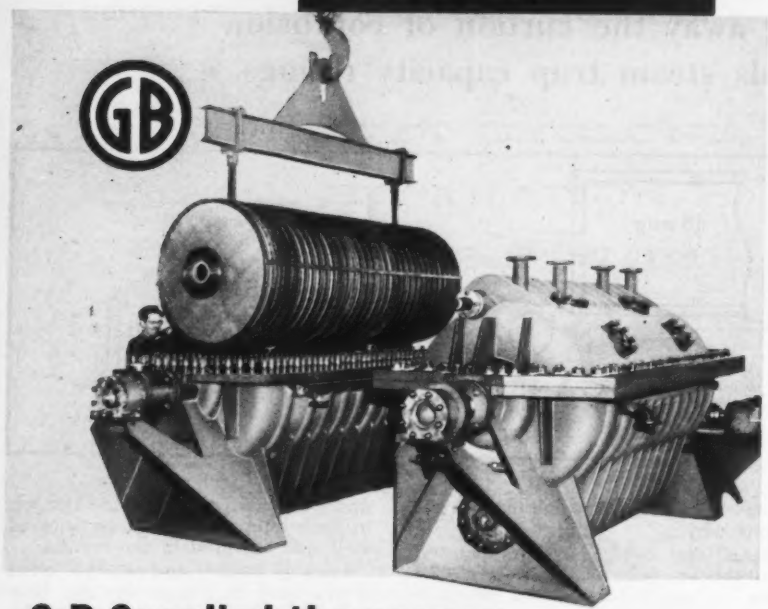
Additional information on trap capacity ratings, plus data on how to correctly size, install and maintain steam traps for any pressure, any temperature and any load, are presented in the 48-page Armstrong Steam Trap Book. Ask your local Armstrong Representative for a copy or write:

Armstrong Machine Works
8802 Maple Street
Three Rivers, Michigan

ARMSTRONG STEAM TRAPS

Check 3471 opposite last page.

The problem: How to handle a hot inflammable liquid under high pressure safely



G-B Supplied the answer with these large Vallez Rotating Leaf Pressure Filters

These large Vallez Rotating Leaf Pressure Filters were designed especially for the new Phillips Chemical Company polyethylene plant at Adams Terminal, Texas.

These filters are supplied with a special steam jacket to keep the contents hot and are designed to operate at 160 psig. Special emphasis was given throughout the designing and fabrication of these filters to handle a hot inflammable liquid under high pressure safely. This is typical of G-B engineering know-how.

G-B Engineers are at your service to discuss your processing problems without cost or obligation.

GOSLIN-BIRMINGHAM
MANUFACTURING CO., INC.
BIRMINGHAM, ALABAMA

FILTERS • EVAPORATORS
PROCESS EQUIPMENT
CONTRACT MANUFACTURING
including HEAVY CASTINGS

Check 3472 opposite last page.

Rare metal salt solutions concentrated by grid-type heat exchangers

High heat transfer rates result in rapid evaporation

Grid-type heat exchangers are being used by a large Midwestern processor of rare metals to concentrate tantalum fluoride. Specially designed and fabricated to close

Heat exchanger is designed for processing rare metals

tolerances, units are installed in bottom of crystallizer. Inlet and outlet connections extend through walls of vessel and connect with inlet steam and exhaust lines.

Revolving agitator blade, rotating horizontally directly above grid, circulates salt solution, boosting heat transfer, and speeding evaporation.

Similar units can also be used to concentrate salt solutions of titanium, uranium, zirconium, beryllium, hafnium, plutonium, and other rare metals. Heat transfer rates per square foot of heating surface are high. Units are reported to be practically unaffected by the acids and salts present.

(Nocordal grid-type heat exchangers are product of Heil Process Equipment Corporation, 12901 Elmwood Ave., Cleveland 11, Ohio.)

Check 3473 opposite last page.

3-D controlled motion featured on rugged screen separator

Uses: Screening, separating, or grading wide range of materials, either wet or dry, coarse, heavy or light.

Features: Calibrated settings permit close control of motion in any one of three directions.

Description: Separator has screens designed and mounted for long life and efficiency. Screen assembly is easily and quickly replaced in matter of

a good team for steam

This Yarway team has scored high—over a million installed on all types of steam equipment. Stocked and sold by 270 Industrial Distributors. For free Steam Trap Book, write YARNALL-WARING CO., 125 Mermaid Ave., Philadelphia 18, Pa.

go YARWAY with confidence

Check 3474 opposite last page.

minutes. Machine is light in weight and quiet in operation. Its base operates practically vibrationless.

Units are available with one, two, or three decks in either plain or stainless steel construction. Lubrication and maintenance is simple. Two

Screen separator not only provides three-dimensional motion, but also permits motion in each direction to be selected according to calibrated settings

top bearings are served by a positive oil mist system with low-level automatic cutoff for safety. Lower bearing is grease-packed and sealed.

Separator uses a one hp motor. Screen motion is transmitted by positive mechanical linkage. Once motion has been set, it is not affected by product loading during operation.

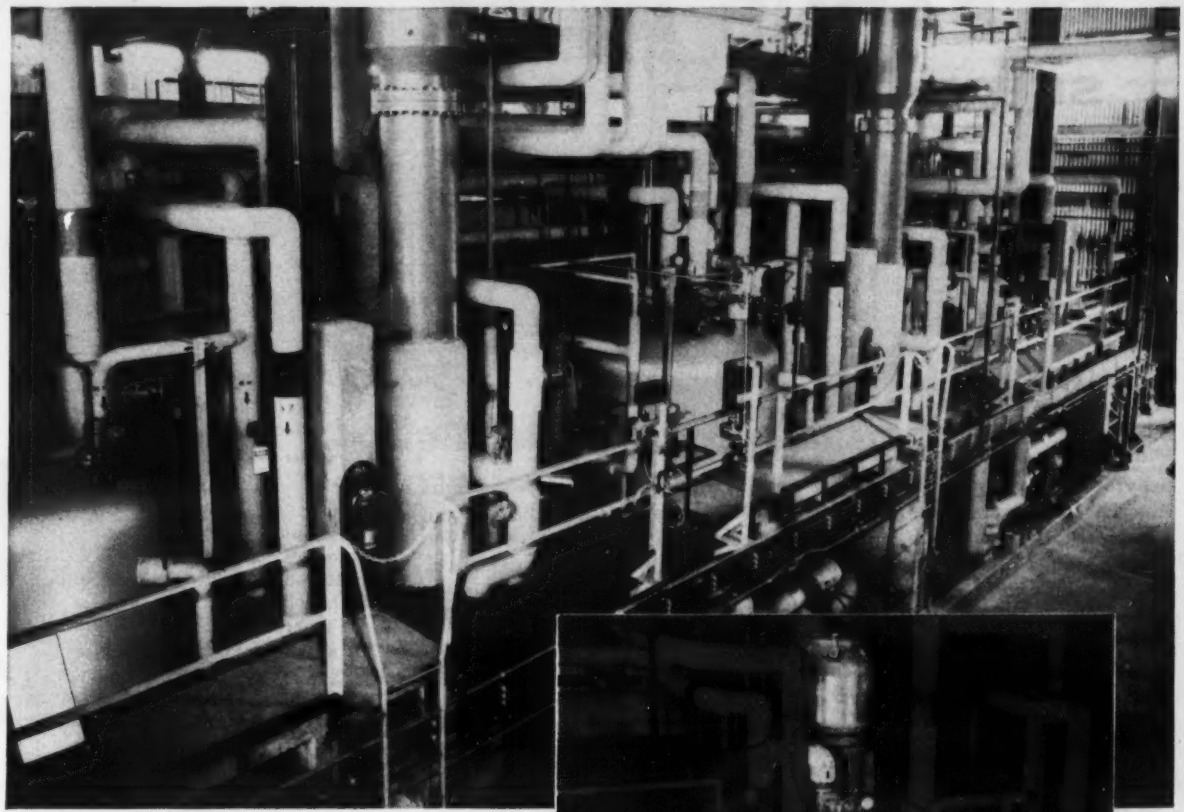
Mixing action imparted to material handled can be varied from high turbulent to intense but gentle motion. Calibrated settings permit easy duplication of runs.

(Syncro-Matic separators are product of The De Laval Separator Company, Industrial Division, Poughkeepsie, N.Y.)

Check 3475 opposite last page.

Industrial radiation processing is topic of 32-page bulletin. Technical and economic factors that must be considered in applying electron-beam radiation to industrial processing, including cross-linking of plastics, polymerization and initiation of chemical reactions are covered. Bulletin has over 50 illustrations, tables, charts, and graphs, as well as mathematical formulas. Extensive bibliography is included. "Handbook of High Voltage Electron-Beam Processing" may be obtained by letterhead request to Bul P — High Voltage Engineering Corporation, Burlington, Mass.

FIRST LARGE-SCALE HIGH-ENERGY LIQUID FUEL PLANT USES COWLES DISSOLVERS



(Above) Portion of $38,000,000 plant being operated by Callery Chemical Company for the Navy, showing typical Cowles Dissolver installations.

(Right) One of six giant Cowles Dissolvers installed by Callery Chemical Company in new Muskogee, Oklahoma, HiCal® plant.

Because Cowles Dissolvers provided the best pattern of dispersing materials and compounds to fine particle size in the shortest possible time, Callery Chemical Company selected six of the largest Cowles Dissolver models for this great new plant. Basic in efficiently processing the highly critical materials involved is the patented Cowles Impeller with its unique power transmission system.

Close cooperation between engineers of Callery, The Ralph M. Parsons Company and Morehouse-Cowles, led from a two-stage operation to a single-step method combining the dispersion and reaction stages.

If your product requires ultimate dispersion, dissolving, emulsifying or deagglomeration, a Cowles Dissolver will do it better, faster, in less space, at less cost.

Let us prove it in your plant at our risk . . .

Write us today about your problem. Our applications engineers are at your service to help you solve it!

MOREHOUSE-COWLES, INC.
1150 San Fernando Road, Los Angeles 65, Calif.

IT'S THE TEETH THAT MAKE THE BIG DIFFERENCE!

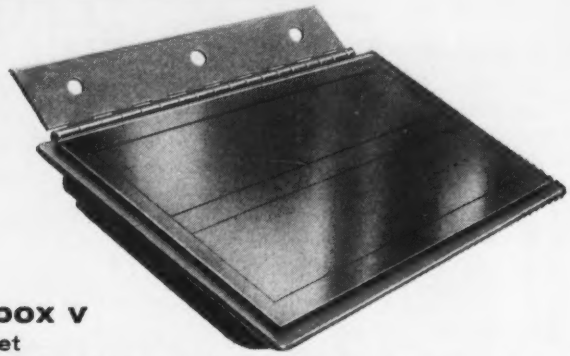
Representatives in principal cities
Convenient lease and time-payment plans.

Check 3476 opposite last page.

NEW FOR PROCESS INDUSTRIES...

lowest* cost magnetic protection against tramp iron with

STEARNS INDOX SEPARATORS!



Stearns INDOX V Plate Magnet

provides separating efficiency far superior to ordinary plate magnets. For processes that involve handling flowing material in chutes, spouts, ducts or on conveyors, check the Stearns Indox V Plate Magnet before you specify. Greater tramp iron protection at lower cost, less weight. Holding power up to 25 percent greater than ordinary magnets. Extremely compact, saves space. Standard widths from 4 inches to 48 inches to fit most chutes. Write for Bulletin No. 1073-B.

Stearns INDOX Grate Magnet

can be installed in any hopper or floor opening, chute or duct. You get continuous, low-cost protection against troublesome tramp iron — with 4 times more protective surface than in ordinary plate magnets. Collecting tubes with continuous magnetic poles leave no "dead" spots where tramp iron can sneak past. Wing-type unit for floor opening or hopper installation, drawer-type unit for chutes and ducts. Both types with either single or double banks of collecting tubes, sizes to fit most standard systems, plus special designs for circular or irregular openings. Write for Bulletin No. 1072-B.

*Let us give you a dollar-for-dollar comparison.

ONLY STEARNS offers the revolutionary advantages of INDOX — an amazing ceramic magnet material that is permanently magnetized to produce an ideal flux pattern for maximum effective tramp iron separation.

STEARNS MAGNETIC PRODUCTS

A DIVISION OF THE INDIANA STEEL PRODUCTS COMPANY

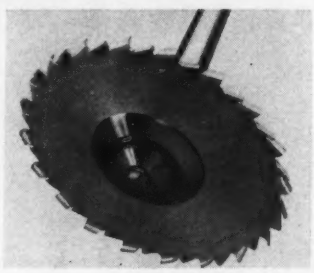
635 SOUTH 28TH STREET • MILWAUKEE 46, WISCONSIN

Check 3477 opposite last page.

PROCESSING EQUIPMENT

Impellers are designed to speed adhesives, glue production

Faster production of adhesives and glues are reported through use of improved impellers. Designed for use on manufacturer's line of dissolvers, the patented impellers



Impeller vanes travel at speeds up to 6000 fpm

can handle viscosities in excess of 50,000 centipoises. Splash and dead spots are said to be eliminated.

Powered by motors ranging in size from 1 through 50 hp, the narrow impeller vanes travel at speds up to 6000 fpm. Units are available in diameters from 3 through 24".

(Further information about impellers for Cowles dissolvers may be obtained from Morehouse-Cowles, Inc., 1150 San Fernando Road, Los Angeles 65, Calif.)

Check 3478 opposite last page.

Long service life, minimum maintenance on mixers

Heavy-duty units have lifetime lubricated bearings

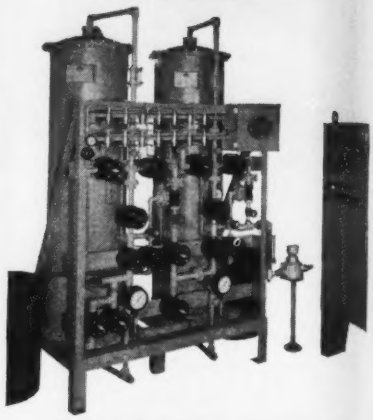
Uses: Mixing dry or pasty materials in chemical and allied industries.

Features: Mixer's improved design assures long service life even under severe operating conditions. Minimum of maintenance and lubrication is required.

Description: Improved line of mixers has double rows of permanent-type lubricated bearings located to give shafts maximum support for complete rigidity. Bearings are of

SET IT DOWN! HOOK IT UP!

ILLCO-WAY ionXchange EQUIPMENT



COMPLETE AUTOMATIC DE-IONIZER

Here is a complete, loaded, fully-instrumented, *automatic* ionXchange unit in a neat, compact, and *ready-to-operate* "package." It is equipped with our own Illco/Matic, all-plastic, air-actuated valves, which have been specially developed for ionXchange service. The Control Panel, also our own design and manufacture, provides all necessary quick-adjustment features, and requires only electrical hook-up to the terminal box on the frame. The only other connections required are to plant service.

FULLY ASSEMBLED AND READY TO INSTALL

All structural assembly of elements, all piping, all wiring, and all installation of air lines is done in our factory by men of long experience. Then the unit is tested for proper operation of all circuits, loaded with the proper supporting beds and resins, painted, bolted to a skid, and crated for delivery to the exact spot it will be used. *This is the quickest, easiest, and surest way for you to get a reliable, ready-to-go ionXchanger* — arranged and instrumented to suit your special needs, whatever they are.

Write for Particulars

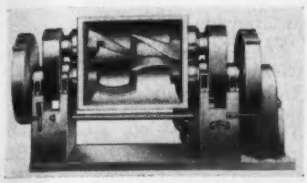
ILLCO-WAY | ILLINOIS WATER TREATMENT CO. 840 Cedar St. Rockford, Ill.

NEW YORK OFFICE: 141 E. 44th St., New York 17, N.Y.
CANADIAN DIST.: Pumps & Softeners, Ltd., London, Can.

Check 3479 opposite last page.

low-friction type and can be used at elevated temperatures, if desired.

Improved seals assure minimum risk of contamination. Precision-bored housings for bearings and seals provide accurate alignment. Seals are easily accessible for maintenance.



Mixer's improved design provides for long, tough service

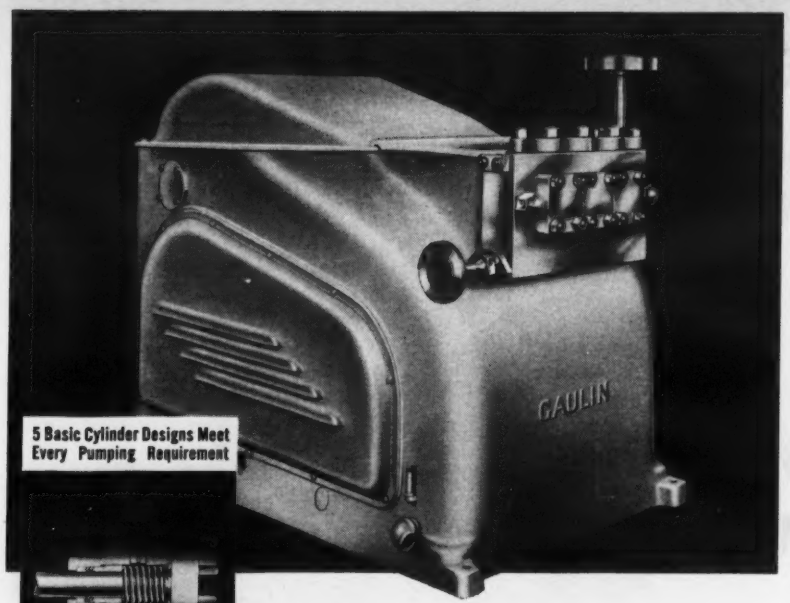
Gears are protected from dust and dirt by guards which remain in place whether the bowl is in mixing or dumping position. Gears may be lubricated through doors in the guards.

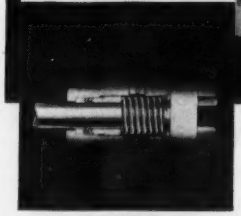
Mixers are available in sizes ranging from three to 300 gallons. Various materials of construction can be had. Hydraulically-operated tilting mechanism is also available. Jackets for heating or cooling can be provided. Several types of blades are offered.

(Heavy-duty mass and paste mixers are product of Paul O. Abbé Inc., 239 Center Ave., Little Falls, N. J.)

Check 3480 opposite last page.

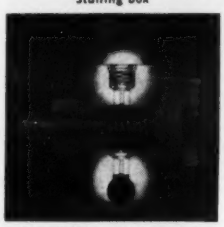
"He's on his lunch hour."



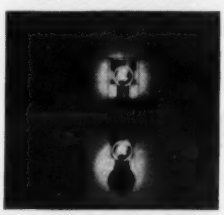


Spring loaded packing

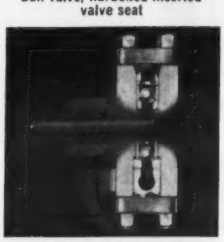
Packing adjusting screw style stuffing box



Poppet Valve, stainless steel



Ball valve, hardened inserted valve seat



Ball valve, removable seats

Gaulin Triplex Pumps Increase Your Pumping Capacity, Extend Your Pumping Pressures . . .

Reduce Operating and Maintenance Costs, Too!

Gaulin Horizontal Triplex Pumps handle large volume of all types and densities of fluids. Rugged, compact and dependable, they provide long service life at minimum maintenance costs in transfer, metering and spray drying applications.

Horizontal Design provides well area separating product from crank case.

Well Area can be gasketed for maintaining sterility . . . or for inert compatible chemicals (gases or liquid) for hazardous materials.

Gaulin Cylinder can be disassembled in minutes.

Capacities from 50 to 6500 GPH . . . pressures from 500 to 12,000 psi.

Write for Bulletin P-55. At the same time ask for GTA . . . *Gaulin Technical Assistance* . . . for experienced advice and factual data on the best method to move or blend your product.

Gaulin TRADE MARK
MANTON Gaulin

55 Garden Street, Everett 49, Mass.

World's largest manufacturer of stainless steel reciprocating, rotary, pressure exchange pumps, dispersers, homogenizers and colloid mills.

Ask GTA . . .

Gaulin Technical Assistance — for data on the complete Gaulin line: Homogenizers, Colloid Mills, Submicron Disperser, Triplex High Pressure Pumps and HX Pumps. Get GTA from your nearest Manton-Gaulin Representative . . .

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998 Farmington Avenue

Check 3481 opposite last page.

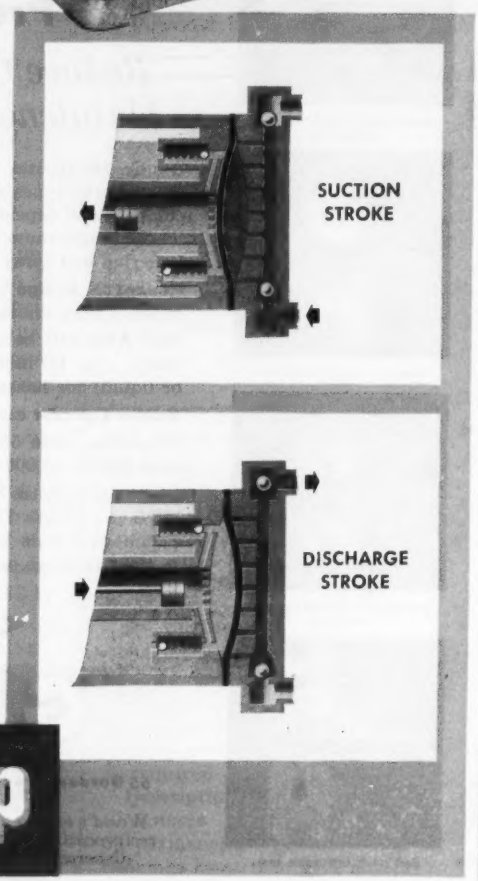
This metering pump has NO STUFFING BOX

Lapp PULSAFEEDER
CONTROLLED-VOLUME CHEMICAL PUMP

Prevents Costly Leakage and Contamination

Lapp Pulsafeeder is a piston-diaphragm pump having a hydraulically balanced diaphragm and a closed hydraulic system. Its reciprocating piston action provides accuracy of positive displacement while the diaphragm isolates liquid being pumped from the pump's working parts. Eliminates need for stuffing box or running seal . . . prevents product leakage and contamination. Maintenance costs, too, are reduced to next to nothing. There are practically no repairs or replacement parts.

All Pulsafeeder pump parts contacting liquid are of special corrosion-resistant materials. Pumping speed is constant; variable flow results from variation in piston-stroke length, controlled manually by hand-wheel, or, in auto-pneumatic models, by instrument air pressure responding to any instrument-measurable processing variable. Pulsafeeder capacities range from 585 ML per hour up to 24 gpm maximum flow and pressures from minus atmospheric to 6800 psig.



WRITE FOR BULLETIN 440 containing typical applications, flow charts, description and specifications of models of various capacities and constructions and special leakage chart. Lapp Insulator Co., Inc., Process Equipment Division, 3509 Poplar St., Le Roy, New York.

Lapp

Check 3482 opposite last page.

Radio frequency heating drys product efficiently in matter of minutes

Unit operates economically, can handle 5 tons per day

Uses: Although developed originally to dry rayon cakes, unit may also be used to process other nonmetallic fibrous and porous materials.

Features: Dryer operates on principle of dielectric heating. High frequency radio current passing through product being processed generates heat from within. Moisture is removed economically in matter of minutes — or even seconds, with no danger of damage to heat sensitives. Unit can operate continuously.

High frequency dielectric dryer operates at 66% efficiency

Description: Compact dryer measures only 15 x 7½ x 13½' high, which is considerably smaller than conventional dryers of same capacity. Handling rayon cakes, unit can process up to five tons per day, heating product to about 265°F. Dryer normally operates at about 66% efficiency. Each lb of moisture evaporated requires only ½ kwh of electricity. Several full size units are now in commercial use drying rayon.

Dryer consists of a high frequency oscillator, product conveyor, and heat recovery system. Oscillator is a tank-loaded unit with a triode oscillator tube.

Electrically insulated electrodes are located in a heated and insulated doughnut-shaped oven. Specially designed feed-through insulators support electrodes and isolate oscillator from the oven. Grounded

electrodes are on inside of outer panels. The enclosure is heated by steam to above 212°F to prevent condensation of water vapor.

Moisture removed from product rises and stratifies in upper portion of oven. Containing about 90% water, the vapor passes through an opening in top of unit and enters the condenser surrounding the dryer. Condensed water is then cooled in a heat exchanger.

If there is need for hot water, fuel consumption can be cut further by using the hot water discharged from the dryer.

Here are economics reported in a typical case: Cost of electricity was computed at $0.006 per kwh. Low pressure steam at $0.65 per 1000 lb. Under these conditions the energy charge for dielectrically evaporating one lb of water was $0.003. A credit of $0.001 per lb was obtained by recovering the heat from the hot water.

Moisture content of processed material can also be controlled by conveyor speed. Dryer may be adapted to handle packages, blocks of materials, or continuously moving webs of varying thicknesses. Operation is essentially "push-button". A single man can operate up to three dryers.

(Thermatool high frequency dielectric dryers are product of New Rochelle Tool Corporation, Main and Evans Streets, New Rochelle, N.Y.)

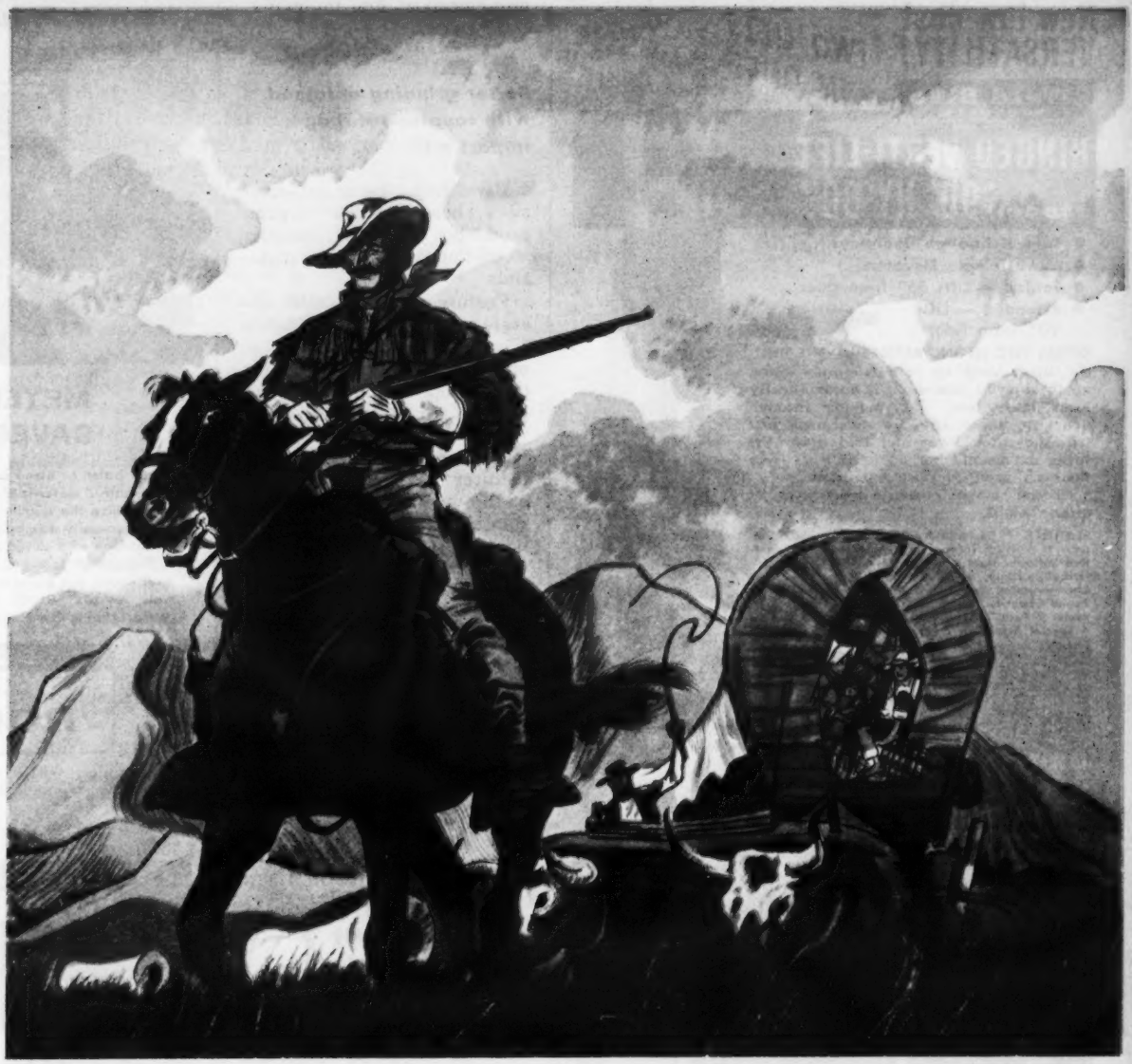
Check 3483 opposite last page.

Rotary-drum filters, for continuous filtration of chemicals, oil stocks, and other materials are cataloged in Bul 208-1—Goslin-Birmingham Manufacturing Co., Inc., P.O. Box 631, Birmingham, Alabama.

Check 3484 opposite last page.

How to specify perforated metal for coal and aggregate screens is described in brochure. Twelve specification steps are listed. Photographs illustrate various types of screens. Screen brochure — Cross Perforated Metals Plant, National-Standard Company, Carbondale, Pennsylvania.

Check 3485 opposite last page.



PIONEER...

Early Americans, pushing Westward, typified the spirit of pioneering that has made this country the world's industrial leader.

Today, this capacity for active pioneering is nowhere better illustrated than in the development work carried on continuously by the makers of Mikro-Products. The Mikro Plan was created specifically to meet the production needs of the processing industries in the field of grinding, air conveying and dust collection.

The Plan includes:

- Mikro Engineering to create equipment for new uses, and to improve existing methods.
- Mikro Laboratory Analysis for more effective methods of processing customers' materials.
- Mikro Service, a world-wide service, for on-the-spot solution of problems, including shipment of MIKRO replacement parts within 48 hours of order.

Mikro Plan facilities are at your disposal without obligation. Call on us at any time.

MIKRO-Products

SPAN THE GLOBE

PROCESSING SYSTEMS

GRINDING CONVEYING COLLECTING

Pulverizing Machinery Division • Metals Disintegrating Company, Inc.
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REPRESENTATIVES throughout the United States, Continental Europe, British Isles, Canada, Mexico, Central and South America, West Indies, South Africa, India, Japan, Philippines, Australia and New Zealand.
MANUFACTURING FACILITIES: United States, Canada, Continental Europe, British Isles.

Check 3486 opposite last page.

New low cost VERSATILITY! TWO LIFTS IN ONE!

"Weld-Bilt" Products

HINGED VERTI-LIFT
Model "90" HY-BOY

- Take it through Doorways
- Move it onto Elevators
- Folded — Lifts 55" from floor
- Extended — Lifts 90" from floor

OFFERS TWO LIFTING RANGES IN ONE UNIT: To lift or stack up to 90", simply swing up the hinged extension; it automatically locks into place. For moving through doors or under any low clearance, just trip the catch lever and fold down the tower extension. For up to 55" lift from floor no need to raise extension.

Special stops prevent over-travel at either height.

FEATURES. • Powered by 12-volt heavy-duty battery • Built-in safety valve, recharger, ammeter and indicator light • Unitized Electro-Hydraulic Pump, and Heavy-Duty, Chrome-plated Ram • 1500 Pound Capacity at 13" load center • Push Button Controls • Special Accessories for Special Tasks

NOW . . . Get your copy of new CM558 HY-BOY Catalog!

WEST BEND EQUIPMENT CORP.
Materials Handling Engineers
322 Water Street • West Bend, Wisconsin

Check 3487 opposite last page.

Stackable, safe-pouring space savers

Hackney chemical containers are built of Types 304 and 316 stainless steel. Bottom foot ring fits snugly over top ring of barrel beneath for *safe stacking.*

Saves warehouse space, handling time. Lightweight. Strong. Leakproof. Full-curled top, bottom rings provide full, comfortable gripping areas. Cut dropping, spilling to minimum. Splashproof spout optional equipment. Hold approximately 15½ gallons. For details, write:

Hackney

Pressed Steel Tank Company
Manufacturer of Hackney Products
1463 South 66th Street, Milwaukee 14, Wisconsin
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CONTAINERS AND PRESSURE VESSELS FOR GASES, LIQUIDS AND SOLIDS

Check 3488 opposite last page.

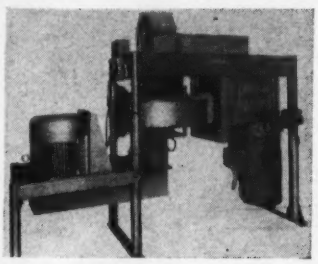
PROCESSING EQUIPMENT

Better grinding obtained with counter-rotating impact mill

Uses: Reducing to sub-sieve sizes heat-sensitive organic products, such as plastics, wood-flour, and similar materials.

Features: Impact mill operates with counter-rotating action. Outer wall revolves in opposite direction to rotor, thus compounding the impact force at any given rotor speed.

Description: Conventional impact mills made by manufacturer have only the rotor of the unit spinning. Counter-rotating action of new mill boosts efficiency, permits particle size reduction in sub-sieve ranges using reduced horsepower requirements. Production capacities of up to 9000 lbs per hr are possible.



Mill's outer wall revolves in opposite direction to rotor, resulting in improved grinding at less hp

In one specific test installation processing cake flour, mill yielded greater improved symmetry, boosted compactness of grain, all of which resulted in a much whiter color in the finished baked cake.

Equipment manufacturer has mill available at develpoment laboratory for product testing and application engineering.

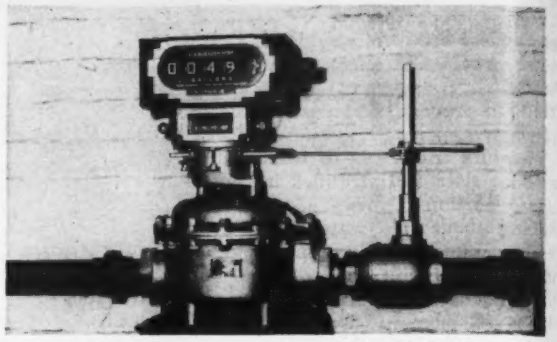
(ControlMil Series-27 impact mills are product of Entoleter Division of Safety Industries, Inc., New Haven, Conn.)

Check 3489 opposite last page.

Pelletizers of various types are illustrated and detailed in Pelletizer Folders—Taylor, Stiles & Company, 20 Bridge St., Riegelsville, N.J.

Check 3490 opposite last page.

It Figures!



METERING LIQUIDS SAVES YOU MONEY

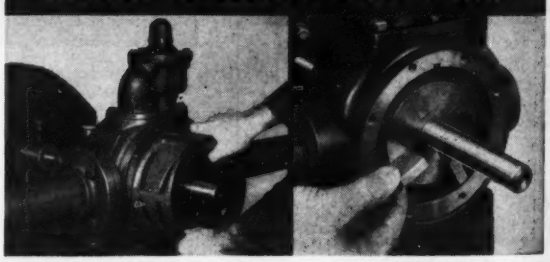
If you batch or blend liquids the automatic shut-off type Rockwell ER Industrial meter (pictured above) gives positive quantity control to stabilize the quality of your end product. You'll eliminate the need for costly weigh tanks and laborious handling—also gain the advantage of a closed piping system.

Throughout your plant Rockwell meters spell advantages wherever liquids are piped or used—for inventory and department controls; for tax records, etc. Our bulletins tell all. Write Rockwell Manufacturing Company, Pittsburgh 8, Pa.

LIQUID METERS
another fine product by
ROCKWELL

Check 3491 opposite last page.

REPLACING THESE PARTS AVE BUYING A WHOLE NEW PUMP



REPLACEABLE CYLINDER LINER REPLACEABLE VANES

With Blackmer rotary pumps, normal wear occurs on these easily replaceable parts. New vanes and cylinder liner can be installed quickly without disconnecting either the piping or the motor. Often, after years of service, you can make a Blackmer pump good as new for as little as 15% of the cost of a whole new pump. For more details, ask for Bulletin One.

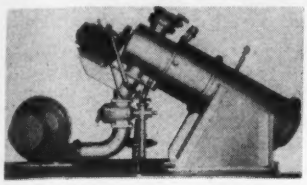
"liquid materials handling"® equipment
BLACKMER
BLACKMER PUMP COMPANY, GRAND RAPIDS 9, MICH.
See Yellow pages for your local sales representative

Check 3696 opposite last page.

Finely-divided materials heat treated efficiently in feeder-heater

Uses: Heat treating granular or finely divided materials.

Features: Unit combines effective mechanical and combustion principles to provide simplified heat treatment continuously and efficiently. With proper ratios of fuel and air, uniform heating as low as



Feeder-heater unit permits continuous heating of granular materials

400°F or as high as 2400°F may be applied. Gas or oil may be used as fuel.

Description: Feeder-heater unit is available in several capacities up to 4000 lbs. In operation, material to be heated is fed through unit by screw feeder. Product is then picked up and carried with combustion air into and through a stable flame where it is heated while in suspension.

Discharged mixture of heated material, flame, and products of combustion is directed through a refractory-lined tubular furnace. Product drops out by gravity. Gases pass through cyclone. Machine can also be used with various types of existing furnaces. Unit can be mounted horizontally and fired through furnace wall.

(Model-B Feeder-heater was developed by Steel Processing Division, Fort Pitt Bridge Works, 212 Wood St., Pittsburgh 22, Pa.)

Check 3492 opposite last page.

For more information on developments reported in this section, check corresponding numbers on Reader Service Slip opposite last page of this issue.

A significant new development in chemical mixing methods

The Smith Turbine Mixer is a remarkable new unit designed to give theoretical dispersion of particle size and ingredient to a wide range of dissimilar or disproportionate chemicals.

The Smith Turbine is a very high speed rotary mixer which actually propels the materials in a swift blending, braiding, folding action that mixes without mashing — coats without crushing. There are no wheels to "grind" ingredients or alter particle size—only efficiently shaped blades that provide intensive controlled turbulence without dead spots.

This high-speed action means high production from a small-sized mixer. Turbines are especially compact, require no special installation, and are so vibration-free they can be operated in close proximity to delicate laboratory instrumentation without disturbing it.

Smith Turbines are available in production sizes as large as 53 cu. ft. Capacity alone is a poor guide to performance, however, since the Turbine turns out batches so much faster than any other type of mixer. Sizes range down to the 2½ cu. ft. model — ideal for lab or pilot plant work . . . just right for forecasts and feasibility tests.

Incidentally, a wide range of mechanical modifications can be had to suit specific mixtures. If you've a knotty special problem, we'll be glad to work with you in developing a solution. Lab-size test equipment will be set up in your plant without obligation.

Impressed? Then investigate! A letter or phone call will bring quick action on additional information — or even a test demonstration in *your* plant using the very chemicals you mix! Fair enough? Then contact us today!

Ultra High-Speed

Extra Thorough Mixing

Unusually Compact

THE SMITH TURBINE-TYPE MIXER

SMITH

THE T. L. SMITH COMPANY

Milwaukee 1, Wisconsin • Lufkin, Texas

Affiliated with Essick Manufacturing Company, Los Angeles, California

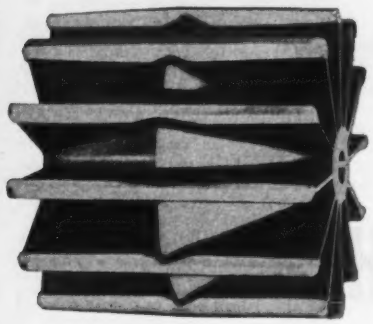
Check 3493 opposite last page.

SPROUT-WALDRON

SW Pointers

for Mixing and Blending • Size Reduction • Pelleting and Densifying • Size Classification • Bulk Materials Handling

Published in the interest of better processing by Sprout, Waldron & Co., Inc., Muncy, Pa.



Stretch Your Conveyor Dollars With Sprout-Waldron Belt Saver® Pulleys

With maintenance costs at an all time high it is worth taking a careful look at the famous Sprout-Waldron Belt Saver® Pulley which has proven its ability to increase conveyor belt life from 50–400%. These cast iron wing and cone quality pulleys prevent crushing of the material between the face of the pulley and the bottom side of the belt. Sharp lumps and abrasive materials slide away from the pulley adding years of service life to the belt. Whether you are handling crushed stone, sand, asbestos, soda, limestone, cupola slag, salt, fertilizer, concrete, gravel or any other abrasive or difficult to handle material, Sprout-Waldron Belt Saver Pulleys can extend the life of your conveyor belts or bucket elevators and minimize your shutdown and maintenance costs.

The following chart which compares Sprout-Waldron cast wing Belt Saver Pulleys with fabricated wing pulleys tells its own story. Our unmatched experience is at your disposal.

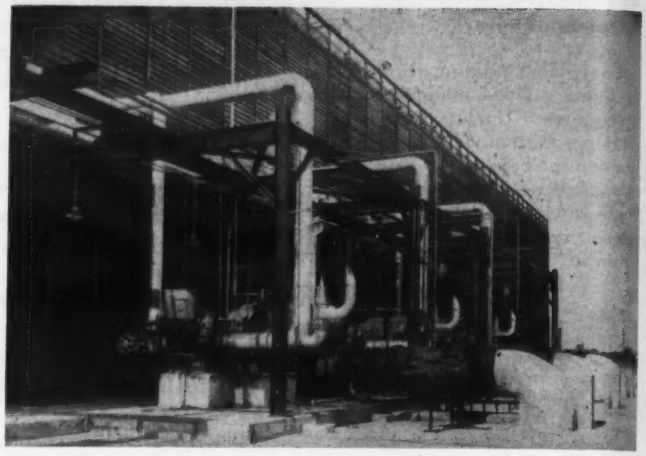
For sizes and prices of Belt Saver Pulleys, write for Bulletin 35–D.

Characteristics	*Sprout-Waldron Belt Saver Pulleys*	*Fabricated Pulleys*
Construction	Cast Iron	Fabricated
Outside Diameter	Precision ground to insure a smooth surface; crown is exact in pitch and is in dead center	Not ground; distortion during welding makes it difficult to maintain exact pitch of crown or to keep in exact center
Hubs	Both hubs are precision bored	Bored on one end only
Bore Length	Extra long to reduce shaft stress—3¾" bore length for 2 7/16" shaft	Short bore—2" bore length for 2 7/16" shaft
Ribs	Fewer ribs needed because belt contact area is greater	Extra ribs required, this means less space for large pieces to discharge. Greater possibility of damage

The above chart was made after careful examination of a widely advertised line of fabricated steel wing pulleys. All the points enumerated may not be true for every competitive pulley, but they are certainly worth your careful review.

COP/101

Check 3494 opposite last page.



This 70,000-gpm induced-draft counter-flow cooling tower has been in successful continuous operation since last summer, running at or above full load

Cooling tower bypasses brackish-water woes

. . . in fulfilling water requirements of butadiene-plant extension

Problem: Proposed 100,000 ton/year extension, to the Port Neches, Texas, butadiene plant of Neches Butane Products Company, necessitated expansion of existing cooling-water facilities. Water for original plant was brought through covered-canal system from Neches River, approximately 1¼ miles from plant site.

During certain seasons of year Neches River is brackish. This resulted in costly pump maintenance and required rubber-lined heat-exchanger channels and cupronickel tubes in original plant.

Solution: A 70,000-gpm induced-draft counter-flow tower was installed to handle additional water requirements of plant extension. Recirculating-water-tower, rather than once-through river-water-circulating, system was decided upon, on basis of capital-expenditure studies. Results indicated recirculating system would entail one third the initial outlay which would be required by an extension of the once-through system.

Due to dissimilarity of water of two systems, interconnection was not possible. Cooling tower consists of 20 cells, capable of cooling 70,000 gpm from 120°F to 90°F at ambient wet-bulb temperature of 80°F. Each cell measures 30 x 30 x 44′ high (to fan-roof deck).

Overall tower dimensions are 60 x 300 x 50′ high to top of fan stack from basin curb. Exhaust-vapor effects are minimized by orientation of tower perpendicular to prevailing summer-wind direction.

Distribution pipe within tower is spiral-wound steel, galvanized after fabrication. Spray nozzles of Bakelite produce full cone pattern and operate at low design pressure. They permit flexible operation with 50% underload and any overload within pump limits.

Testing The System

Satisfactory performance of unit was established last fall under Cooling Tower Institute's Acceptance Test Procedure.

Problems inherent in testing such an installation were complicated by determining fan turbine horsepower. Water returns to tower by means of inaccessible underground concrete pipe. Accordingly, it was decided to measure water flow by means of rectangular weirs at points in basin on one wall, where it discharges to pump suction pit. Six weirs were installed — two per basin section. Head above weirs in each section was measured on opposite wall by hook gage.

In order to set fans, to draw design horsepower for performance test, it was necessary to first determine output horsepower of turbines. This was accomplished by installation of calibrated metering orifices in hot-steam lines of two turbines. In this manner, steam flow could be accurately measured. Two turbines were selected to check for existence of difference between fan-blade settings required to produce design horsepower.

Pressure and temperature of inlet steam, along with speed of turbines, were measured by vibrating-reed tachometer. Performance curves of turbine were used to obtain operating horsepower. Turbines selected agreed closely on fan pitch required to produce design horsepower. Remaining fans were set accordingly.

Each cell is equipped with 18′ diam, four-blade fan, driven through low-speed spiral-bevel gear and intermediate-speed double-helical gear by single-stage non-condensing 60-hp turbine. Flexible couplings are stainless-steel disc type, requiring no lubrication.

Turbines, rather than electric motors, are used to drive fans since entire installation is steam-operated. Low pressure steam is available from inherently exothermic plant operation.

Water circulation is maintained by three Murray turbine-driven cooling-water pumps. Each has design capacity of 35,000 gpm. Distribution to condensers and coolers in butane dehydrogenation plant is by means of underground concrete pipe. Main headers are 60″ ID.

Proper and even flow of cooling water in basin to pump sump, and isolation of parts of cooling tower, are maintained by division of basin into approximately three equal and separate sections. This permits shut-down of a portion of tower to drain and clean basin, while keeping 12 out of 20 cells operating. Storage capacity of basin is over one-half million gallons of water.

Make-up water quantity is approximately 2100 gpm or 3.2%. Dissolved solids of tower water are kept considerably below 5000 ppm. Cooling-tower water is treated for algae by shock chlorination. Careful control of pH is maintained by acids or caustic injection.

Results: Since start-up last summer, cooling tower has successfully continuously operated at or above full load, in providing cooling-water for butadiene-plant extension.

(Induced-draft cooling tower was designed and constructed by Foster Wheeler Corporation, 666 Fifth Ave., New York 19, N. Y.)

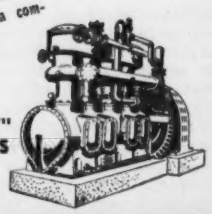
Check 3495 opposite last page.

(Murray turbine-driven cooling-water pumps are product of Worthington Corporation, Harrison, N.J.)

Check 3496 opposite last page.

Making dry ice at 109° below zero using standard ammonia compressors in an improved cycle.

"HEAVY DUTY" COMPRESSORS



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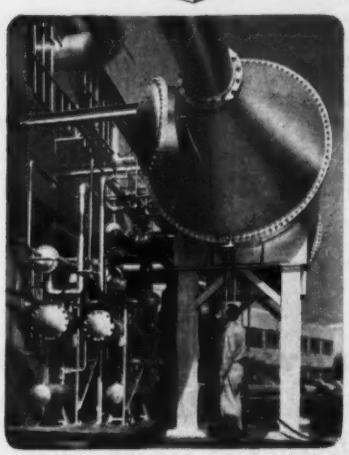
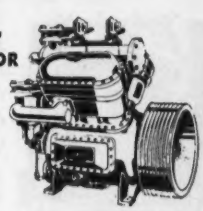
to solve your most difficult cooling problems.

If you need any type of industrial or commercial cooling—for quick freezing, cold storage, ice making, humidity control, low temperatures, condensing, air conditioning, or any process work—contact the nearest Frick Branch or Distributor for recommendations and estimates.



Cooling air under pressure for supersonic speed tests.

"ECLIPSE" COMPRESSOR



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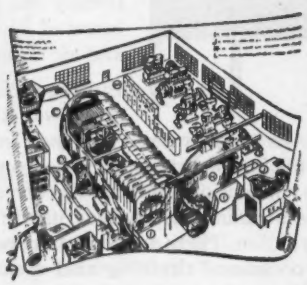
Test laboratory work for temperatures down to 140° below zero.



All-weather Laboratory built for U. S. Army. Uses 3-Stage compressors, mantains Arctic, tropic and stratospheric condititions.

Check 3497 opposite last page.

UNIQUE PUMP DESIGN

IN PLASTIC

NO STUFFING BOX OR SHAFT SEALS

ELIMINATES SHAFT LEAKAGE, SCORING, CORROSION

NEW LOW-MAINTENANCE FEATURES:

■ No shaft seals ■ No metal parts in contact with fluid ■ Simple, sturdy, minimal maintenance ■ Flexible liner absorbs abrasive action of suspended solids ■ Non-agitating ■ Non-contaminating ■ Self-priming; high vacuum ■ Operates wet or dry ■ Capacity range 1/3 to 40 Gallons Per Minute

Vanton Plastic Pumps have for years been handling the toughest pumping problems in process plants, pilot operations, and laboratories. They do the routine jobs better, and save overall costs as well! Low-cost, versatile, simply but carefully engineered, their combination of radically new design principle plus plastic minimizes maintenance, gives complete protection against leakage, corrosion, contamination, abrasion.

OPERATES LIKE SQUEEGEE ON RUBBER HOSE: all fluid moves in channel between outside of flexible rubber or synthetic liner, and inside of molded plastic or stainless bodyblock. Pumping mechanism is rotor mounted on eccentric shaft inside liner. At each revolution it creates progressive squeegee action on fluid trapped between liner and housing.

Plastic Materials Include: PVC, high-temperature polyethylene, Teflon (DuPont), Buna N, bakelite, etc.; even stainless steel to handle any commercial corrosive.

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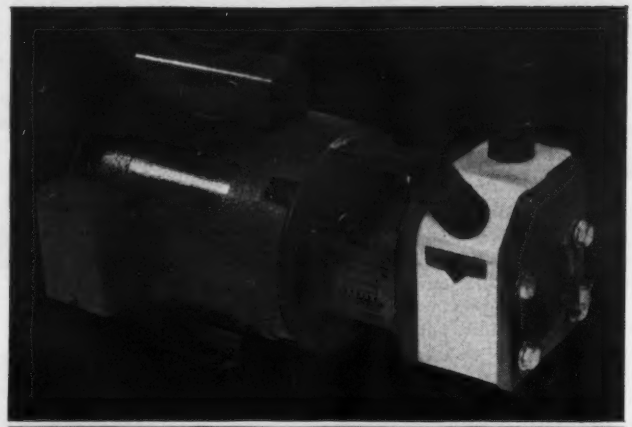
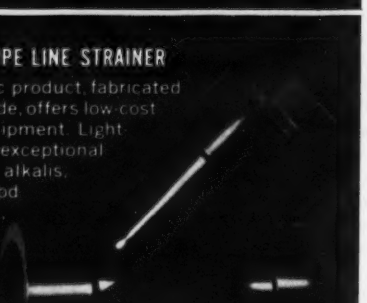
DIVISION OF COOPER ALLOY CORP., HILLSIDE, N.J.

SPECIALISTS IN PLASTIC FLUID HANDLING, PLASTIC PUMPS, VALVES, PIPING, FITTINGS, SPECIALTIES



NOW! ALL-PVC PLASTIC PIPE LINE STRAINER

This newest Vanton plastic product, fabricated entirely of polyvinyl chloride, offers low-cost protection for process equipment. Light weight, sturdy, versatile; exceptional resistance to most acids, alkalis, and active chemicals. Good impact strength, non-toxic, non-flammable. Strainer element easily replaced without removing unit from line. Sizes ½" - 3", socket-weld or threaded ends. Write for literature.



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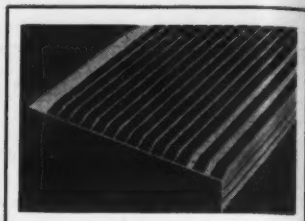


Stair treads

. . . have flat abrasive surface for non-slip footing. Treads are nine-inches wide with beveled back. They fit steps up to 13 in in width. Length may be to 12 ft. Deep 1⅛-in nose of heavy aluminum extends over edge of step to protect face.

(Super Stairmaster treads are products of M-R Division, Wooster Products, Inc., 1000 Spruce St., Wooster, Ohio.)

Check 3501 opposite last page.

Floor-resurfacing costs reduced 15 to 25%

Uses: Floor-resurfacing applications.

Features: In one application, use of material saved approximately 15 to 25% in labor and material costs. This was attributed to easy workability of substance in handling.

Description: Polyplastic alloy, with liquid reactor hardens from paste or liquid into 100% solids, without volatilization. Combination of epoxies is chemically inert and non-toxic. It contains no polyvinyl acetate, polyethylene, natural or synthetic rubber or acrylics. Physical properties are as follows:

Tensile strength, psi	10,000
Compressive strength, psi	36,000
Water absorption, %	0.11-0.12

(Dascrete is product of Dasco Chemical Company, Inc., 1602-04 Thames St., Baltimore 31, Md.)

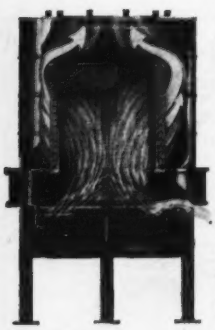
Check 3502 opposite last page.

Solenoid valves are tabulated in eight-page Factory Stock List 505—Automatic Switch Co., Florham Park, N.J.

Check 3503 opposite last page.

LOW PRESSURE DROP OIL BATH AIR FILTER

for turbocharged engines, compressors, blowers



The Air-Maze Type LPD (Low Pressure Drop) oil bath air filter makes possible low static pressure loss operation without any outside energy or moving parts whatever. As a result, it offers particular benefits in cleaning of intake air on turbocharged stationary engines, since pressure losses of silencers, piping, elbows and air cleaners are additive.

Built specifically for larger range air flows, it offers resistances as low as 1" of water. As shown in the illustration, oil-scrubbing of intake air is accomplished by reversing the conventional oil and air current. Thus, low pressure loss is attained without sacrifice in efficiency, or oil washing action. There are no moving parts. Service is limited to occasional draining and cleaning of an oil sump.

Available in sizes from 800 to 16,500 cfm. Write for Bulletin LPD-1055. **The Air-Maze Corporation, Dept.** CP-8, **Cleveland 28, Ohio.**

Check 3499 opposite last page.

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designed and built for individual product and process requirements

Batch and Conveyor Types up to 1000° F

Gas, Electric, Steam, Oil — Radio Frequency Power

Write for Bulletin 157

YOUNG BROTHERS CO.

1825 Columbus Road • Cleveland 13, Ohio

Over 60 years of service

Check 3500 opposite last page.

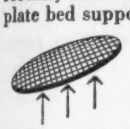
a filter man's thinking

"Expediency: when time is more precious than gold (or platinum)"

BY JULES P. KOVACS, V. P., PUROLATOR PRODUCTS, INC.

There's more than one way to skin a cat . . . or filter a chemical that fights any attempt to tame it.

As an example, here's a problem we recently licked in developing a diffusion plate bed support for a highly corrosive gaseous fluidized bed reactor, operating at very high temperatures. Pore size had to be 25 microns, able to support 20 psi. And it was needed in a *hurry*.



Now, anyone who knows filters could pick metals for such a job. The obviously ideal medium would be inconel. Trouble was, it was impossible to obtain a fine enough inconel screen. Of the only other metals that could withstand the corrosive action, gold lacked high temperature strength; platinum was too weak without support and too costly, though it did offer the high temperature strength and corrosion resistance needed. And that's where Purolator's special capabilities came into play.

Our engineers solved it by combining the finest mesh size of platinum available–150–with a fused facing of porous gold powder to reduce pore size to the specified 25 microns — and supported by inconel grids. Problem solved. Customer deadline met.

But the story doesn't end there. Purolator engineers immediately set about to find a way to take advantage of standard inconel mesh economy for similar applications. This is how we do it: inconel metallic edge type units are sliced in two, and two of equal thickness are punched out. One is rotated 90° from the other and fused by Purolator's exclusive process. By carefully controlling the amount of fusion material, we produce the exact pore size required. Simple?

It's *not* simple, of course. But it's typical of Purolator's complete service for special jobs. We live with challenges all the time. Want to read about some? Our brochure called "New Roles for Filtration" is just off the press and it will be interesting reading. Send for your copy.

Filtration For Every Known Fluid

PUROLATOR
PRODUCTS, INC.
Rahway, New Jersey and Toronto, Ontario, Canada

Check 3504 opposite last page.

Solvent drops on CrO_3 may spell disaster

Chemical reactions and military booby traps have one characteristic in common—ability to convert without warning an apparently harmless environment into an extremely unpleasant situation. For this reason, attention should be given to that delicate balance which may tip the scale towards either a safe controlled reaction or a runaway uncontrolled one.

One example of this balance in action is the oxidizing power of chromic oxide (CrO_3) on flammable solvents. Chromic oxide, when heated to 330°C, decomposes suddenly, giving off oxygen and evolving heat (equation A). Further heating produces chromic sesquioxide (equation B).

A) $4CrO_3 \rightarrow 2Cr_2O_3 + 3O_2$

B) $6CrO_3 \rightarrow 2CrO_3 \cdot Cr_2O_3 + 3O_2$

If drops of flammable volatile solvent, such as acetone, methyl ketone or ethanol, contact solid dry chromic oxide, a few seconds may elapse while some oxygen reaches critical 330°C temperature. At that point combustion occurs, with enough vigor to raise fireballs several feet in the air. Chromic oxide spatters over wide area.

This marks the initial appearance of a new series in CHEMICAL PROCESSING. Contributions by our readers are welcome. If you know of any dangerous situations, along the lines suggested by this article, please send an account of them to:

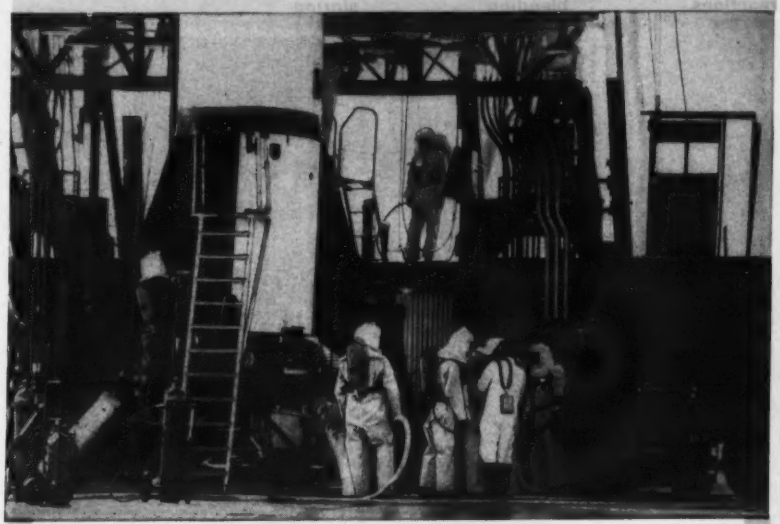
Safety Editor
CHEMICAL PROCESSING
111 E. Delaware Pl.
Chicago 11, Ill.

(Information in this article is based on paper presented before National Safety Congress by Howard H. Fawcett, Safety Director, Research Laboratory, General Electric Company, Schenectady, N.Y.)

WHEREVER BIG THINGS ARE BEING DONE

IN MILITARY ESTABLISHMENTS THROUGHOUT THE WORLD

(AND ELSEWHERE)



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Check 3505 opposite last page.

FLUIDICS

is a new PFAUDLER PERMUTIT program that provides a modern, imaginative approach for handling and processing more profitably the liquids and gases involved in such operations as:

corrosioneering	**ion exchange**	**metering**	**agitation**
water treatment	**evaporation**	**valving**	**heat transfer**
waste treatment	**distillation**	**piping**	
reactions	**blending**	**storing**	

NEW THROUGH FLUIDICS

Tantalum bayonet heaters with zero corrosion loss

Ten years of research and development work with tantalum at our Pfaudler Division continue to pay off with the first production of tantalum bayonet heaters.

Where recommended, tantalum has complete, 100% corrosion resistance. Generally speaking, you can use these heaters with all acids except hydrofluoric and fuming sulfuric.

Since corrosive attack is non-existent, you have no corrosion allowance to consider. High wall conductance provides extremely high heat transfer coefficients.

Design: Tantalum envelope over inner distributor tube of carbon steel which serves as steam ejector. Tantalum sheet is extremely thin because of tantalum's high tensile strength.

Standard sizes: 1½" O.D. tubes in lengths to 72" in clusters up to 5 units, offering up to 12 sq. ft. of high transfer area. Also 2" O.D. tubes in lengths to 84" in clusters up to 4 units with heat transfer area up to 15 sq. ft.

Other developments in tantalum. 275-gallon tantalum lined reactor already being produced. Pfaudler is prepared to work in capacities of 1000 gallons and up. Also ready to make tantalum protected shell and tube heat exchangers in all practical sizes, having already made a 14 sq. ft. unit.

Write for the new tantalum bulletin to our Pfaudler Division, Dept. CP-89, Rochester 3, New York.

PFAUDLER PERMUTIT INC.

Specialists in FLUIDICS . . . the science of fluid processes

Check 3506 opposite last page.

Some corrosive areas are suitable spots for open motors

Silicone-rubber insulation guards stator windings

A supported silicone-rubber insulation system is now available on form- and random-wound AC motors. System is said to be 300% stronger than unsupported silicone-rubber types of insulation.

Silicone compound completely covers stator windings of random-wound motor

Open motors equipped with this insulation may be applied in environments previously limited to more complex motor enclosures.

Coating protects wire coils and steel stator laminations to provide positive seal against moisture and contaminants. It will not crack from heat expansion and contraction of coils and laminations. Also, it is thin enough to provide proper heat transfer and motor cooling.

System consists of silicone-rubber-impregnated dacron and glass tape wrapped around each coil in several layers. Before installation in motor, each coil is vulcanized to bond wrapping into completely sealed protective layer.

(Polyseal Class B system of supported silicone-rubber installation is development of General Electric Company, Schenectady 5, N. Y.)

Check 3507 opposite last page.

Complete vapor protection with emergency suit

Uses: In areas where acid and vapor protection is required.

Features: Suit is constructed with full-cemented seams and gum-strapped on outside. It is completely vulcanized after assembly and has no needle holes.

Description: Opening and closure of emergency vapor-proof suit is accomplished with self-sealing slide fastener extending from left knee, over left shoulder and around head. Window incorporates air space in two-ply sealed construction. Two positive-pressure

Vapor-proof emergency suit can accommodate several types of respiratory apparatus

release valves are at front, with individual covering flaps.

(Vapor-proof emergency suit 75/20 is product of Union Industrial Equipment Corporation, 40 Beech St., Port Chester, N.Y.)

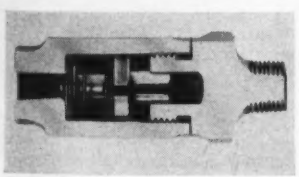
Check 3508 opposite last page.

Four-piece construction in check-valve body

Uses: Checking of fluid flow when pressure changes.

Features: Valve construction includes only four pieces. It withstands pressures to 2000 psi, hydrostatic.

Description: Components of positive-shut-off check valve



Check valve, shown here in closed position, is designed to withstand pressures to 2000 psi, hydrostatic

consist of R Monel body and cover enclosing Monel valve stem and Inconel spring.

Valves can be installed in vertical or horizontal position. It has ⅜" IPS threads at both male and female ends. It is 3½" long x 1¼" diam.

(Air check valve is product of Robert H. Wager Co., 423 Valley St., South Orange, New Jersey.)

Check 3509 opposite last page.

"Did you look in D.J.'s locker for my P.F.I. STANDARDS?"

SEND COUPON BELOW FOR THESE P.F.I. STANDARDS

1 Machining Backing Rings for Butt Welds
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4 Shop Hydrostatic Testing
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6 Built-up Weld, Metal Bosses
7 Welded Nozzles—Spacing
8 Preheat-Postheat Before, After Welding
9 Arc-Welding Dissimilar Ferritic Steels
10 Stress Relieving Practices

There's no need to look "high and low" for missing P.F.I. Standards, you simply mail the coupon below for the copies wanted.

Listed at the left are ten technical bulletins that are proving their usefulness to many engineers.

These P.F.I. Standards are packed with vital data on the design, the fabrication and erection of high pressure and high temperature piping used by all industry. However, these technical bulletins do not explain the many advantages of shop fabrication.

Remember, shop fabrication by the companies responsible for the development of P.F.I. Standards is your only real assurance of meeting the most exacting requirements of piping, whether it's welded, bent, coiled or vanstoned . . . in any metal as a component or a complete assembly. Write for all ten P.F.I. Standards or indicate in the coupon below which ones could be helpful to you.

P.F.I. THE PIPE FABRICATION INSTITUTE

THE PIPE FABRICATION INSTITUTE

Devoted to the Technical and Economic Problems in Piping

ONE GATEWAY CENTER, PITTSBURGH 22, PA.

Please send me the P.F.I. Standards indicated
1 2 3 4 5 6 7 8 9 10 CP-8

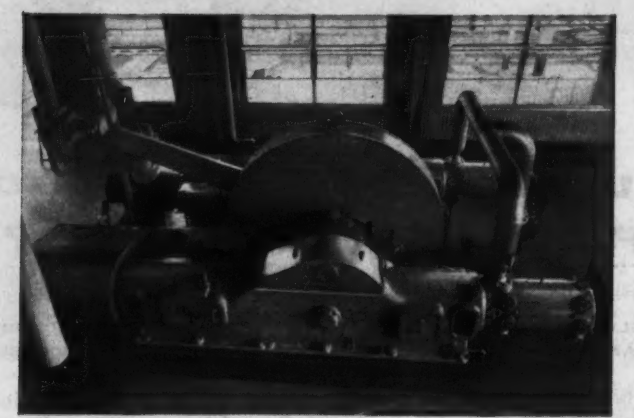
Name _____

Company _____

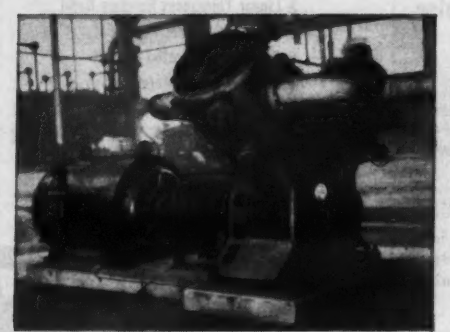
Address _____ City _____ State _____

Check 3510 opposite last page.

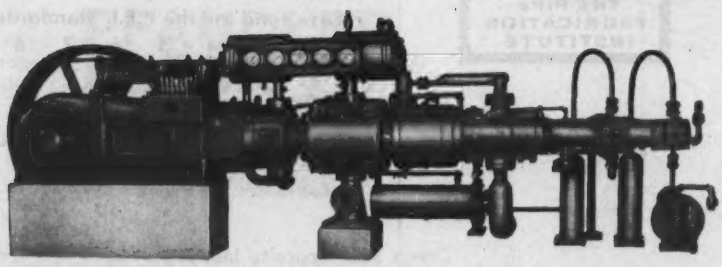
FOR EVERY PROCESSING REQUIREMENT THERE'S A CP COMPRESSOR MADE JUST FOR THE JOB



Class "H", steam-driven, four-corner, single-stage hydrocarbon gas booster.

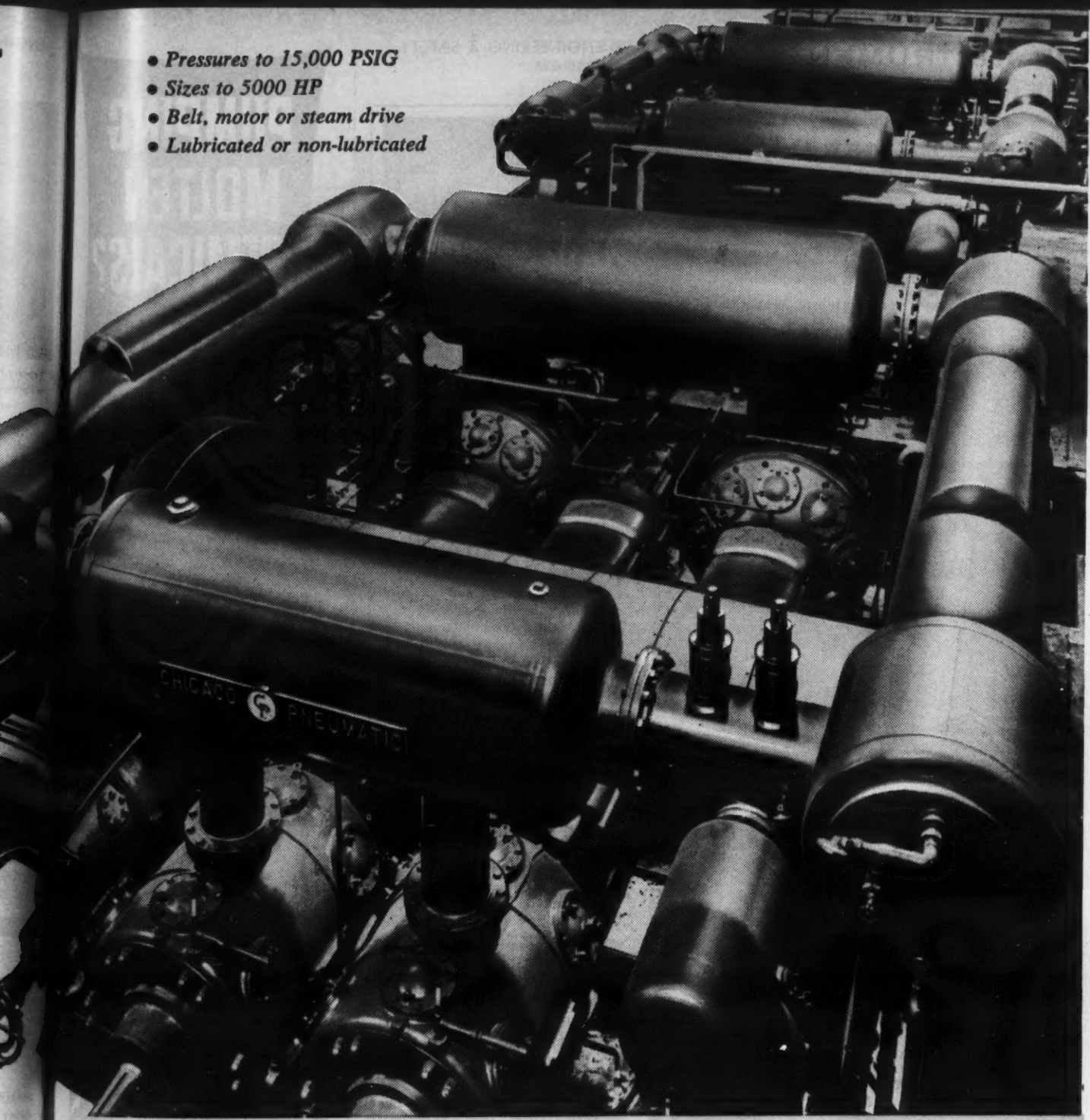


Class "Y" butane compressor, coupled to an explosion-proof motor. In service in a large refinery.



Class "T", horizontal, straight-line, five-stage helium compressor. 6000 psig; 100 hp size.

- *Pressures to 15,000 PSIG*
- *Sizes to 5000 HP*
- *Belt, motor or steam drive*
- *Lubricated or non-lubricated*



Two Class "FE" balanced-opposed compressors in process work. 3500 hp; five-stage.

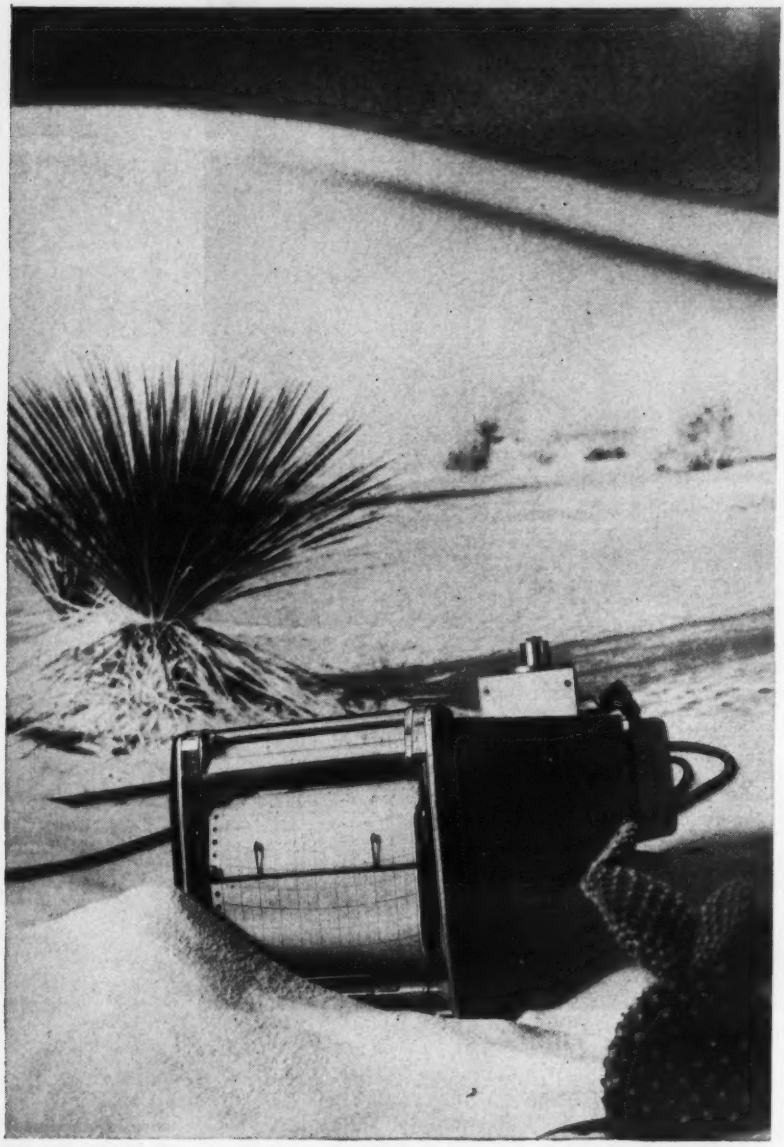
Chicago Pneumatic 8 East 44th Street, New York 17, N. Y.

AIR AND GAS COMPRESSORS • VACUUM PUMPS • PNEUMATIC TOOLS • ELECTRIC TOOLS • DIESEL ENGINES • ROCK DRILLS • HYDRAULIC TOOLS

For more information on product at left, specify 3511 see information request blank opposite last page.

KEEP YOUR INSTRUMENT AIR LINES DESERT-DRY...

Get Lectrodryer — it costs you *less* to pay *more*. When product quality hinges on the performance of sensitive pneumatic instruments, it doesn't pay to skimp on instrument protection. Lectrodryers give you *proved drying ability*, plus long-range dependability, and that's why they cost somewhat more. They are designed generously; materials are of the best. Ask about the new Lectrodryer Budget Dryer. It's built especially for instrument service, when small quantities of air are required. Other standard Lectrodryers are available for larger volumes. Contact Pittsburgh Lectrodryer Division, McGraw-Edison Company, 352 32nd Street, Pittsburgh 30, Pennsylvania.



Lectrodryer® McGRAW EDISON

Check 3512 opposite last page.

Disposable protective garments

. . . tailored from non-woven material have application in areas where throw - away protection from contamination by liquids, dusts, and noxious fumes is needed.

Material (Kaycel) is made by bonding soft cellulose wadding to cross-laid web of threads. It is then treated for fire resistance and water repellency. Material can be cut, sewn, glued, and grommeted.

(Kaycel is product of Kimberly-Clark Corporation, Neenah, Wis.)

Check 3513 opp. last page.

(Garments are product of Ace High Division, Williamson-Dickie Mfg. Co., 509 W. Vickery Blvd., Fort Worth 1, Tex.)

Check 3514 opp. last page.

Air compressors — horizontal, water-cooled, single-stage — designed for nine out of 10 compressed-air applications are described and pictured in eight-page bulletin. Bul 350—Pennsylvania Pump and Compressor Co., Easton, Pa.

Check 3515 opposite last page.

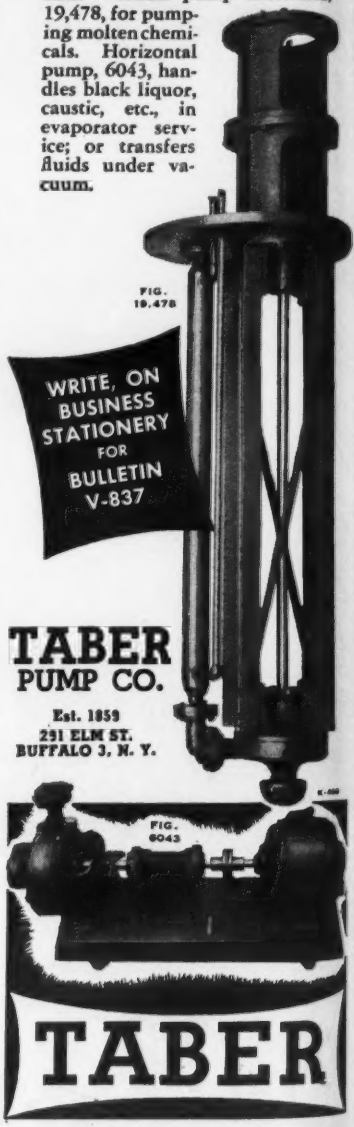
Water-treating-equipment developments are covered in 24-page booklet including explanatory diagrams. Water-treating equipment Bul 615—Elgin Softener Corp., 136 N. Grove Ave., Elgin, Ill.

Check 3516 opposite last page.

PUMPING MOLTEN CHEMICALS?

write TABER

Whatever your pumping needs.. why not put it up to Taber.. long experienced pump specialists. Vertical pump illustrated, 19,478, for pumping molten chemicals. Horizontal pump, 6043, handles black liquor, caustic, etc., in evaporator service; or transfers fluids under vacuum.

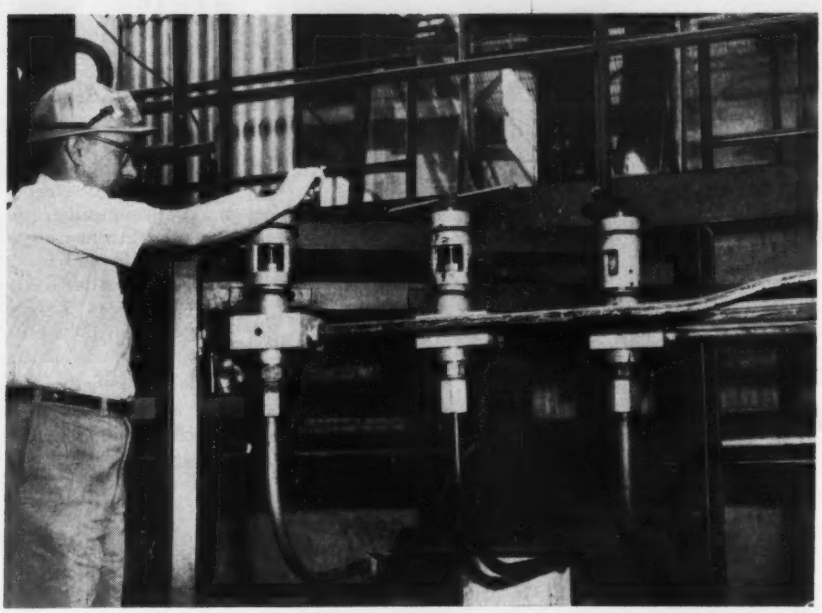


WRITE, ON BUSINESS STATIONERY FOR BULLETIN V-837

TABER PUMP CO.
Est. 1859
291 ELM ST.
BUFFALO 3, N. Y.

TABER

Check 3517 opposite last page.



Valves have been in successful operation, in 30,000-psi ethylene-polymerization service, since 1954

Valves hold the line under 30,000 psi

. . . in ethylene-polymerization process

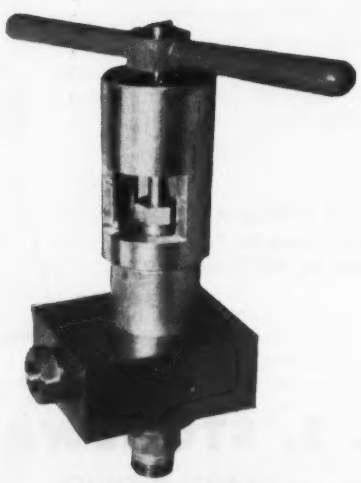
High-pressure on-off service in ethylene-polymerization process, is being fulfilled by ⅝"-port valves, at polyethylene plant of Spencer Chemical Company in Orange, Texas.

Valves operate under pressures to 30,000 psi with temperatures to 200°F. They were installed in 1954 and have provided satisfactory service. Valves were selected because of prior experience which indicated that they were adequate for such situations.

Design of valves incorporates rotating shaft through packing and non-rotating plug on stem. This precludes leakage while eliminating galling between seat and plug. Plug and seat are constructed of SAE 52100 alloy. Teflon is utilized for packing material.

(Polyethylene-process valves are product of Autoclave Engineers, Inc., Box 1027, Erie, Pa.)

Check 3518 opposite last page.



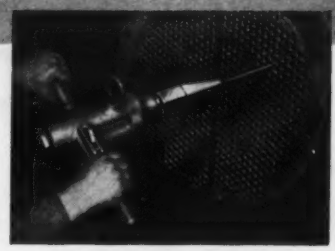
Valve design incorporates rotating shaft through packing and non-rotating plug on stem

Keep Heat Exchangers on the Line with

WILSON

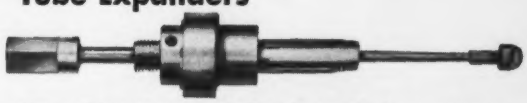
Maintenance Tools

Heavy-Duty TP-301 Cleaner



Positive air-driven, hollow rotary shaft, drill type tool. Tube is scavenged with air or water while cleaning.

Tube Expanders



Wilson Models 41 and 44 Tube Expanders incorporate an improved, adjustable ball bearing thrust collar and are designed for efficient, easy rolling and maximum roll length adjustment for various tube sheet thicknesses.

Torq-Air-Matic Expander Control

New Wilson Torq-Air-Matic is the first and only air-driven tube expander drive that accurately controls tube expansion by directly measuring torque output at the mandrel.

Tube Cutter

Wilson tube cutter is easy to use and does a fast job. Cutter sizes and shanks available to meet all heat exchanger requirements.

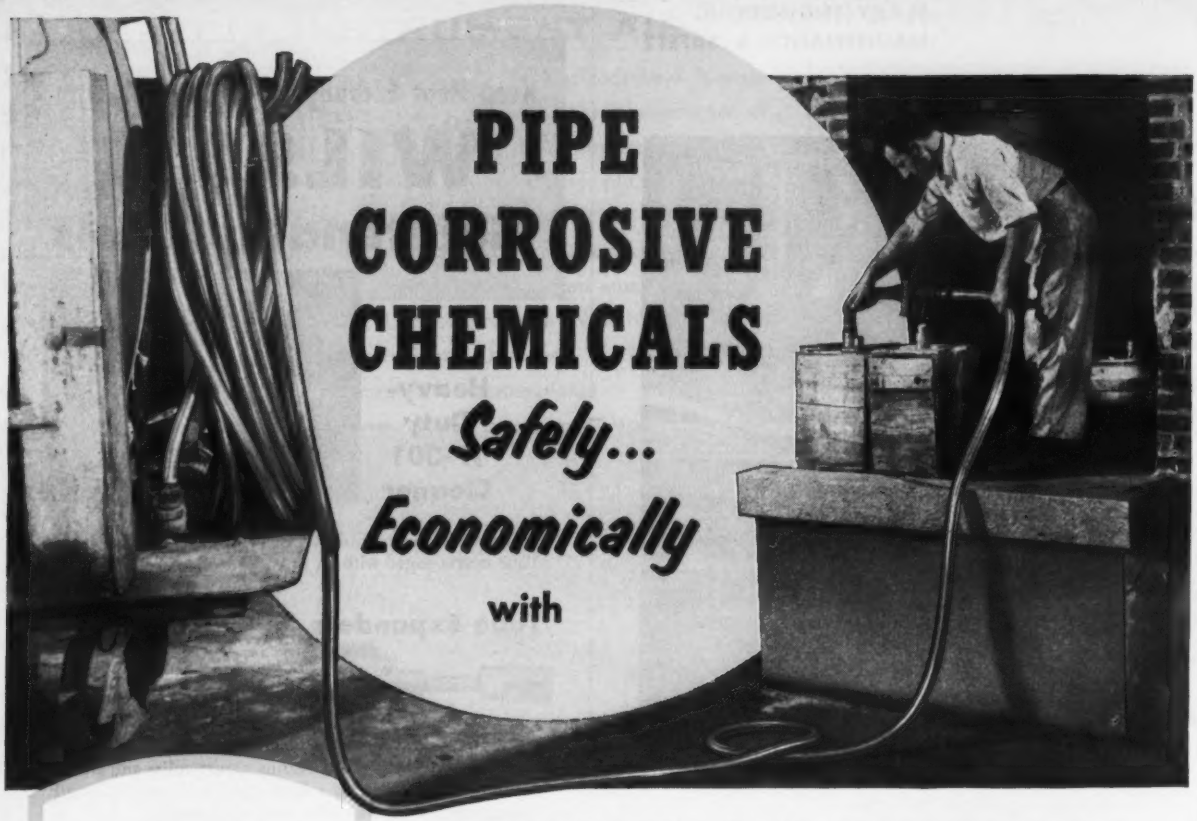
Write today for your copies of Wilson Tube Cleaner catalog No. 77 and Wilson Tube Expander catalog No. 88.

Representatives in principal cities
Thomas C. Wilson, Inc. • 21-11 44th Ave., Long Island City 1, N. Y.
Cable address: "Tubeclean", New York

WILSON TW888

TUBE CLEANERS • TUBE EXPANDERS

Check 3519 opposite last page.



PIPE CORROSIVE CHEMICALS *Safely... Economically* with

TYGON® *plastic* TUBING

CHECK THESE FEATURES:

- Flexible
- Outstanding Range of Corrosion Resistance
- Minimum Extractability to Safeguard Solutions
- Easy to Clean
- Superior Flow Characteristics
- Long Service Life
- 65 Sizes to 4" O.D.

You can't beat Tygon plastic Tubing for versatility, efficiency, safety and economy in handling acids, alkalies, oils, greases, alcohols and many solvents. Its unique combination of advantages saves money right from the start.

Flexible, light in weight and available in continuous lengths, Tygon Tubing is quickly and easily put into service . . . ideal for either permanent or temporary installations. Its hard, smooth bore provides a flow equal to larger sizes of some other hoses. And Tygon's wide range of corrosion resistance, its physical toughness, and its non-aging properties, add up to a long, trouble-free service life.

Get complete technical data and other helpful information on Tygon Tubing. Write today for free Bulletin T-97.

OUR 100th YEAR

PLASTICS AND SYNTHETICS DIVISION

U. S. STONEWARE

AKRON 9, OHIO

439-F

Check 3520 opposite last page.

No tachometer feedback with 100:1 speed range

Uses: Adjustable-speed-drive applications.

Features: Speed ranges of 100:1 and regulation percentages of 1 to 2% are attained without tachometer feedback.

Description: Drives employ magnetic-amplifier unit, driving thyratrons in full-wave circuit, followed by DC shunt motor. Standard-duty line (25) includes 1/6- to ¾-hp range. Heavy-duty series (200) is available in 1/6- to 10-hp models.

(Series 25 and 200 adjustable-speed drives are products of Cleveland Machine Controls, 1155 Brookpark Rd., Cleveland 9, Ohio.)

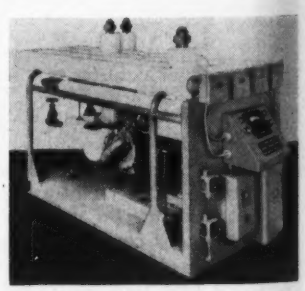
Check 3521 opposite last page.

High-temperature damage to heat-transfer fluid is avoided

Uses: In heat transfer.

Features: Protection against over heating of heat-tranfer fluids is provided by accurately controlled heat source and application of constant velocity to fluid.

Description: Heat-transfer system employs finned-tube design with radial fins parallel to heater axis. This results in maximum heat transfer without return-bend obstruction.



Heat-transfer system incorporates finned-tube design with radial fins parallel to heater axis

Fins permit controlled heat output from short-length tube. Each heating element is rated at eight kw and has design output of 25,000 Btu/hr. System can be used for centrally

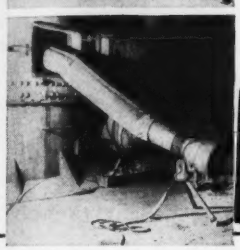
Drive out
FOUL AIR
Blow in
FRESH AIR
with Coppus Type A Ventilator

Assure greater safety, comfort for workers... get greater efficiency.

Drive out dangerous fumes, gases, stagnant or hot air from boilers, cable manholes, tanks, vats and other confined places. *Supply fresh air continuously.*

Send now for further information. Coppus Engineering Corporation, 388 Park Avenue, Worcester 2, Mass.

MANHOLES made safe for workers' entrance within minutes.

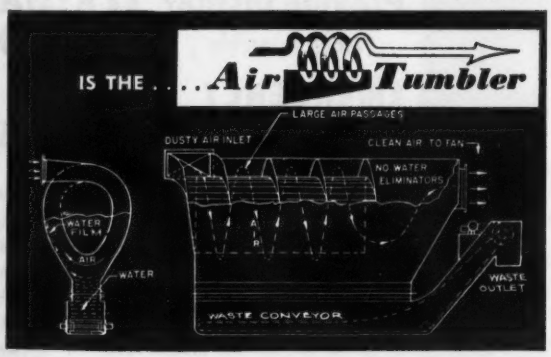


BOILER AND TANK INTERIORS cooled by Coppus. Fresh air supplied continuously.

ANOTHER
COPPUS
"BLUE RIBBON" PRODUCT

Check 3522 opposite last page.

The MASTER of DUST in INDUSTRY



SIMPLE—DEPENDABLE—NO FIRE HAZARD
HIGH EFFICIENCY—CONSTANT CAPACITY
LOW HUMIDIFICATION—LOW OPERATING COST

More than one million CFM in ONE plant

Write for Bulletin No. 581. Address

DUST SUPPRESSION & ENGINEERING CO.
P. O. BOX 67 • LAKE ORION, MICHIGAN

Check 3523 opposite last page.

heating number of processes at same time, even those which require differing temperatures. All pipe equipment, except relief valves and pump, is insulated with at least two inches of 85%-magnesia insulation or equivalent. Totally enclosed motor is fan-cooled.

(Merrill process systems are product of Parks-Cramer Company, Fitchburg, Mass.)

Check 3524 opposite last page.

(Finned heating elements, utilized in heat-transfer system, are product of Trent, Inc., 211 Leverington Ave., Philadelphia 27, Pa.)

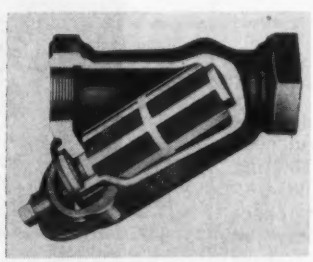
Check 3525 opposite last page.

Aluminum line strainers are corrosion resistant

Uses: Removal of dirt, scale, rust, and other solids from liquid flowing in any pipe system.

Features: Lightweight strainers cannot rust and are highly resistant to corrosive effects of industrial atmospheres.

Description: Aluminum strainers are suitable for pressures to 75 psi and temperatures to 250°F. Woven-mesh brass screens are furnished. Stainless-steel screens are



Strainers incorporate woven-mesh brass screens

available on special order.

Strainers are in stock in ¾ through 4" sizes, screwed ends (187-A); and 2½ through 4", 125-lb ASA flanged ends (187-FA).

(Aluminum line strainers are product of OPW-Jordan, 6013 Wiehe Rd., Cincinnati 13, O.)

Check 3526 opposite last page.

We're Still Looking for a **Pipe Fitter** Who Doesn't Prefer

RIDGID®

"Of Course I said RIDGID . . . It's the only pipe wrench for my money. I've got work to do!"

At your Supply House

The Ridge Tool Company Elyria, Ohio, U.S.A.

THREADED PIPE... *It's Tight... It's Best... Costs Less!*

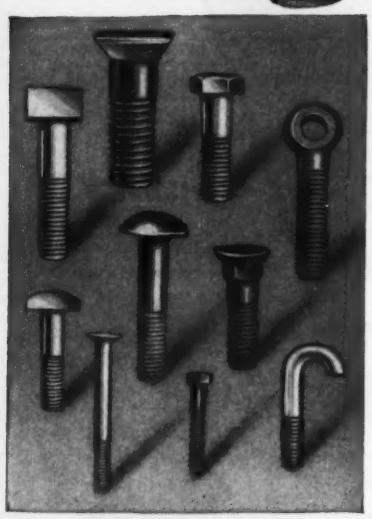
Check 3527 opposite last page.

Threaded Specialties

lower cost
TEE BOLTS
by an
exclusive method

Among Pawtucket's many specialty products are these lower-cost tee-head bolts. Pawtucket's exclusive production method keeps cost low, dimensional accuracy unusually high and strength above standard.
Pawtucket tee head bolts are made in standard sizes ¼" and larger, or to your specifications. In any size, you can depend on a uniform Class 3 fit, if required.

All standard steels, stainless steels and non-ferrous metals, including Titanium



BETTER BOLTS SINCE 1882

PAWTUCKET
MANUFACTURING COMPANY
327 Pine St. • Pawtucket, R. I.
THE PLACE TO SOLVE YOUR BOLT PROBLEMS
T.M. REG.
"The Bolt Man"

Check 3528 opposite last page.

Sustained 4000°F temp won't hamper insulation

Uses: Thermal insulation.

Features: Maximum sustained working temperature for material is 4000°F (inert atmosphere) and 3000°F (oxidizing atmosphere). Low-density material has 90% porosity, while high-density product has 80% porosity.

Description: Self-bonded from of silicon carbide has open-cellular structure. Foam may be machined with standard steel-cutting tools. Physical characteristics are as follows:

	Density: High/Low
Density	0.5-0.6/0.25-0.3
Compressive loading @20°C, psi	750/85
Tensile strength @20°C, psi	70/30
Thermal-expansion coefficient, in/in/°F x 10^{-6}:	
@800°F	1.99
@2450°F	2.91

(High- and low-density silicon-carbide foams are products of New Products Branch, Research and Development Division, The Carborundum Company, Niagara Falls, New York.)

Check 3529 opposite last page.

Lubrication without thinning at 275°F operations

Uses: Ball- and roller-bearing lubrication applications. Also, in plain and needle bearings and on rotating and sliding surfaces.

Features: Lubricant operates without thinning at 275°F. Boiling point is near 400°F.

Description: Multi-purpose lubricant resists erosive effects of hot water, steam and hot air. It is unaffected by mild acid and alkali solutions. Lubricant is available in six densitities.

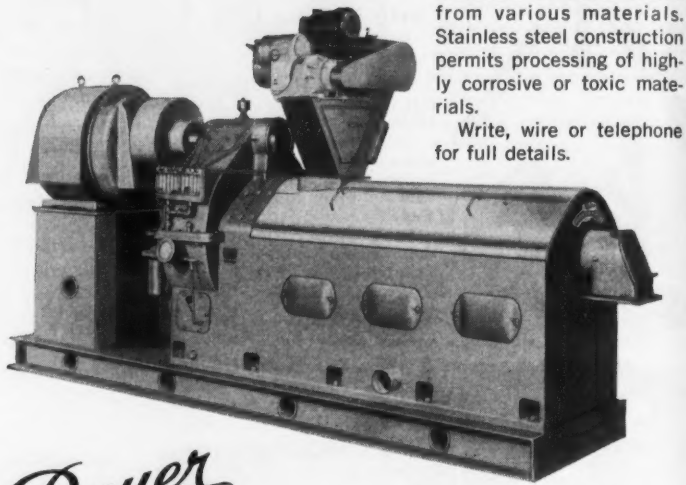
(Lubricant 88 is product of Keystone Lubricating Co., 3100 N. 21st St., Philadelphia 32, Pennsylvania.)

Check 3530 opposite last page.

HAVE YOU A PRESSING PROBLEM?

Bauer Pressafiners are high pressure precision machines engineered specifically for the expression of moisture or other fluids from various materials. Stainless steel construction permits processing of highly corrosive or toxic materials.

Write, wire or telephone for full details.



Bauer
THE BAUER BROS. CO.
1728 SHERIDAN AVENUE • SPRINGFIELD, OHIO

Check 3531 opposite last page.

Model 8933:
Face spray ring acts simultaneously with eye-wash, sending controlled streams of water from specially designed twin fountain heads.

Provide instant relief with . . . HAWS
EMERGENCY EYE and FACE WASH FOUNTAINS

Eye and face hazards are inevitable in industry . . . so take positive steps to reduce the extent of injury and minimize insurance claims. HAWS Emergency Eye and Face Wash Fountains flood contaminated areas with water — instantly ridding face and eyes of caustics, chemicals and dangerous particles. This **instant relief** may well prevent permanent damage — bridging the gap until medical aid arrives. Install extra safety — HAWS Emergency Fountains and Drench Showers.

Write today for detailed information on the complete HAWS line of emergency facilities. HAWS DRINKING FAUCET COMPANY, 1443 Fourth Street, Berkeley 10, Calif.

HAWS

Check 3532 opposite last page.

THAT'S INTERESTING

Na_2SiO_3 comeback

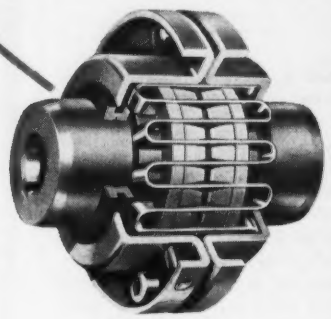
Sodium silicate is rarely used now to preserve eggs. But an Eastern artist prefers silicate-preserved eggs rather than fresh ones in grinding pigments and albumen. Membranes in egg albumen weaken after extended storage in sodium silicate. Quality of weakened albumen gives paint working characteristics artist prefers.

Mighty mite

A new type of battery, only 9 x 5½ x 5-1/16" and based on the silver-zinc couple, powered controls and instrumentation in nation's first operational Snark intercontinental missile. Made by Yardney Electric Corp., Silvercel battery is said to provide same power as ordinary batteries fives times larger and six times heavier.

For more information on product at right, specify 3533 see information request blank opposite last page.

Photo shows portable pump unit connected to internal combustion engine by a Type F FALK Steelflex Coupling



How FALK STEELFLEX Couplings give your connected machinery Double Protection

FIRST: *They protect against shaft misalignment.* Some degree of shaft misalignment is unavoidable—and unless protective compensation is provided, additional loads are developed on shafts, bearings and other revolving elements. The result is excessive wear-and-tear—and often actual breakage....FALK Steelflex Couplings compensate for either angular or parallel misalignment—*or for the more serious condition involving both!* The exclusive Steelflex gridmember which joins the two hubs is not fastened to either hub; thus, either hub can shift in any direction without imposing a load on the other hub.

Yet, important as protection against shaft misalignment is to you, it is only one function of the *truly flexible* FALK Steelflex Coupling.

SECOND: *They protect against torque fluctuations* which create excess wear on connected machines and frequently induce destructive shaft misalignment. The exclusive FALK Steelflex grid-groove design cushions shock loads, dampens vibration, reduces impact loads as much as 30 per cent. You get this extra margin of protection that *can mean the difference between operating and breakdown!* You save on maintenance costs. And—you prolong the service life of your machines!...For complete information, ask your FALK Representative or Authorized Distributor. Or—**write direct for Bulletin 4100.**

FALK and STEELFLEX are Registered Trademarks

THE FALK CORPORATION, MILWAUKEE 1, WISCONSIN

Representatives and Distributors in Most Principal Cities

Manufacturers of Quality Gear Drives and Flexible Shaft Couplings

Basic Type F FALK STEELFLEX COUPLING fills the needs of 90% of industrial applications

This cutaway view shows the exclusive Steelflex design which provides *torsional resilience with the strength of steel.* This torsional resilience spreads peak or shock loads over a relatively long increment of time, thus *greatly reducing stresses* in connected machinery.

The versatile Type F Steelflex can be used horizontally or vertically, without modification or special parts. It is ideally suited to 9 out of 10 applications. For unusual applications involving overload conditions, extended shafts, brakes, etc., standard designs of dual-purpose Steelflex couplings are available.

For most applications, you can give your machines the extra protection afforded by FALK Steelflex Couplings at no extra cost!

FALK

...a good name in industry

St. Lawrence Seaway

From page 26

Senator HOMER E. CAPEHART
(R., Ind.)

It would take a boundless imagination to foresee the effects of the St. Lawrence Seaway 10 years from now. Cheaper goods, more goods, more trade are certain to develop.

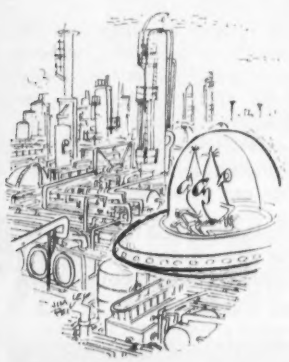
In effect, it opens up a new and vast empire. Undeveloped markets will be exploited. The output of the chemical processing industries of the Middle West will be made more easily available to the world.

Vessels with a draft of 25 feet will be able to enter the waterway. This will accommodate more than half of the world's tonnage.

CARLIS J. STETTIN
Director
Port of Detroit Commission

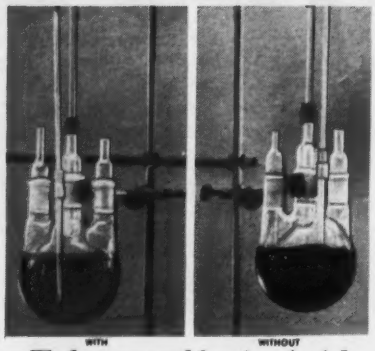
While there will be millions of tons of additional overseas general cargo (handled on the St. Lawrence Seaway), bulk cargo will continue to constitute the lion's share of total tonnages handled. United States and Canadian grain will provide the greatest share, with iron ore running a close second. Rest of the bulk cargo will comprise coal, coke, sandstone, petroleum products, non-ferrous ores, and pulp.

Detroit handled 88,159 tons



"This must be his innards!"

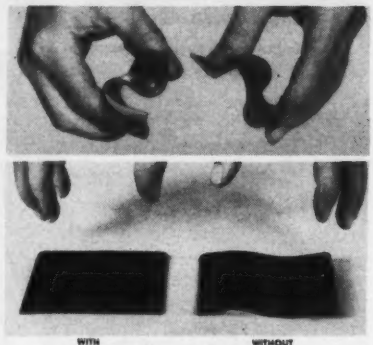
Monsanto Task Force Chemicals . . .



Toluenesulfonic Acid

STRONG ACID CATALYST GIVES "CLEAN," EASILY CONTROLLED ESTERIFICATION REACTIONS WITH HIGH YIELDS

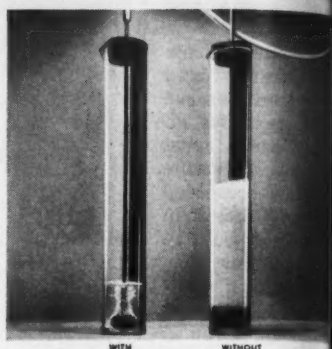
Organic reactions requiring a strong acid catalyst use TSA to produce higher yields with fewer side reactions. TSA virtually eliminates the charring and degradation products caused by oxidizing mineral acid catalysts such as sulfuric. Monsanto TSA has an exceptionally high purity and is the lightest in color of any produced commercially—has proved outstanding for making phenol formaldehyde and alkyd resins. It can also serve in the production of phthalate esters, epoxy resin varnishes, monoglycerides, polyvinyl acetate and similar esterifications. For example, nitrile esterifications (actually a two-step process involving alcoholysis) proceed more cleanly with higher yields and produce esters of better quality when catalyzed by TSA. Examples of the improved technique are reported in the *Journal of Organic Chemistry*, 23, 1225 (1958).



Elastopar

CUTS PROCESSING TIME AND TEMPERATURE TO PUT SPRINGY LIFE INTO BUTYL RUBBER

In most butyl compounds a small amount of ELASTOPAR will boost resilience, vastly increase modulus, raise abrasion resistance, improve low-temperature flexibility, greatly increase electrical resistivity, reduce cold-flow of uncured stocks and lower Mooney viscosity. In rubber products subject to rapid flexing (such as vibration dampening motor mounts) butyl with ELASTOPAR shows much less heat build-up. Yet ELASTOPAR does not change hardness, affect cure or increase the normal time or temperatures of mixing. It eliminates the need for special heat treatment of the stock, making butyl products lower cost than ever. Now manufacturers can take full advantage of butyl's superior impermeability to gases, electrical properties, low initial cost, tear strength, and resistance to weather, heat aging, ozone and oxidizing acids.



Defoamer PC-1344

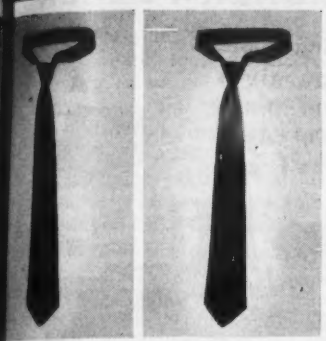
CONTROLS IN-PROCESS FOAMING OF ORGANIC LIQUIDS AND INCREASES REACTOR CAPACITY

A non-metallic complex polymer, PC-1344 eliminates waste space allowed for foaming in the reactor—permits faster through-put and eliminates troubles in processing with many aliphatic or aromatic reactants. It tolerates up to 1.5% water, is increasingly efficient as acidity increases. Concentrations range from a few ppm to 0.50% depending on the process material. In processing of wax, it eliminates the foaming, controls "bubbles" in wax coatings, promotes better leveling. Wax-coating machine speeds can be increased greatly. In alkyd processing, it controls foaming in the resin kettles and often helps reduce the cook time. PC-1344 is also used in various stages of refining, as an additive in petroleum products, and in the chlorination of hydrocarbons. Coatings manufacturers add a few ppm to the finished product to keep lacquers and varnishes from bubbling when sprayed or brushed.

Mission today: **FASTER,**

MONSANTO CAN PUT A WHOLE TASK FORCE OF CHEMICAL "PROCESSING AIDS" AT YOUR COMMAND

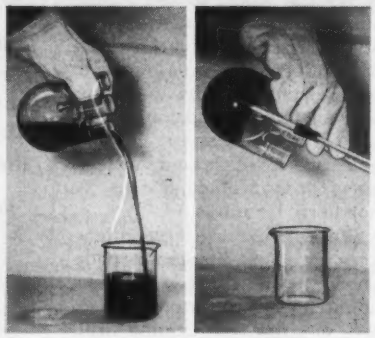
Catalysts, defoamers, shortstoppers, activators, accelerators—one of Monsanto's chemical processing aids may well be the "stimulant" to make your process go smoother, faster, more profitably. Many of them will improve product properties, as well. Turn over in your mind the six processing aids you see here. Consider how their chemistry can contribute to your plant's productivity. For more details, use the convenient coupon. Want to make an immediate evaluation? Write on your company letterhead to: Monsanto Chemical Company, Task Force Chemicals, "Processing Aids B-2," St. Louis 66, Missouri.



Biphenyl

SPEEDS UNIFORM DYEING OF POLYESTER FIBERS, YARNS, OR FABRICS

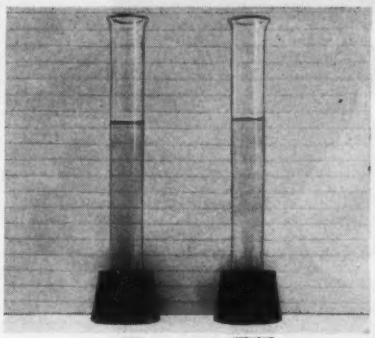
ard-to-dye polyester fibers take eeper, more level coloring faster hen biphenyl is used in the dye th. The presence of biphenyl in- eases the diffusion rate of both isperse- and azoic-type dyes. The iphenyl apparently acts as a "car- er" or dyeing accelerator—deep ades and level dyeing can be chieved with dye bath tempera- ures in the range of 85° C, elimi- ating the need to run the dye bath the range of 110°–130° C. Bi- henyl appears to step up the rate dye diffusion into the polyester ber; the effect is to accelerate the ate of absorption. As little as 6% iphenyl on the dye weight in a 30:1 ye bath promotes this faster dyeing or deep shades and improved level- g. Currently used by a number of ajor dyers, biphenyl may also rove helpful in promoting the more niform coloring of polyesters used or making fiber glass building pan- ls and resin-faced concrete blocks.



Benthal

"SHORTSTOP" SLOWS VISCOSITY BUILD-UP AND CONTROLS ACIDITY OF ALKYD AND POLYESTER RESINS

A molecular chain "stopper," BENTHAL modifies the internal cross-linking of reactive dibasic acids and develops a degree of internal plasticizing in the products. In resin cooking, BENTHAL helps you reduce the acid value and complete esterification before excessively high viscosity develops and gelation occurs. As a laboratory example of the effect of BENTHAL: a 33% linseed oil-modified alkyd cooked at 430° F. reaches the gel stage in 49 minutes with an acid number (on the solids) of 60. With 10% of the dibasic acid replaced by BENTHAL, the resin does not gel for 75 minutes of cook time, shows an acid number of 30. BENTHAL serves to reduce the in-process viscosity of straight alkyds, oil-modified alkyds, and polyesters. It also improves their durability, alkali and water resistance, and gloss.



Triphenyl Phosphite

SPEEDS UP ESTERIFICATIONS, GUARDS AGAINST DISCOLORATION, CHELATES HAZE-FORMING CALCIUM, LITHIUM, MANGANESE

Triphenyl phosphite, in low concentrations (0.10%–0.30%), retards darkening during cooking of alkyds, unsaturated polyesters for glass laminates, saturated polyesters for urethane foams, or terminated polyesters for "permanent" type plasticizers. In combination with barium soaps and epoxidized compounds, it synergizes the combination to produce an excellent vinyl stabilizer system which, at levels of 0.5–1.0%, gives optimum heat and light stability. Triphenyl phosphite also acts as a metal-scavenger. In processes using calcium, lithium, or manganese catalysts, it chelates small amounts of haze-forming metal to keep the final product clear and cloud-free without filtering. Its newest most provocative use, predicted from established activity with high molecular weight alcohols, is to speed up simple esterifications of less complex, lower alcohols.

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- ☐ ELASTOPAR
- ☐ DEFOAMER PC-1344
- ☐ BIPHENYL
- ☐ BENTHAL
- ☐ TRIPHENYL PHOSPHITE

Monsanto Chemical Company
Task Force Chemicals, "Processing Aids B-2"
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BENTHAL, ELASTOPAR: Monsanto T.M.'s, Reg. U. S. Pat. Off.

Check 3534 opposite last page.

of overseas general cargo last year. This represents an increase of nearly 600 percent over 1935. Professional projections arrived at through high-level techno-economic studies indicate the Port of Detroit can anticipate an increase to 300,000 tons of overseas commerce this year. These same authorities have estimated a potential of 750,000 to one million tons within five years.

Our present terminals are in need of help in the matter of expansion to care for the tremendous increase in foreign commerce as forecast by the professional experts.

Senator FRANK J. LAUSCHE
(D., Ohio)

The Seaway brings to mid-continent North America a new perspective — a wide open door to all the world. One cannot envision the full potential beneficial effect.

With the opening of the Seaway will come many new responsibilities to states, provinces, and their port cities. Growing pains will be felt as port facilities are developed to meet new expansion. Industry, states, and cities benefiting directly must, within reason, bear their proportionate share of these costs.

I am confident that with prudence, ingenuity, and perseverance, so traditional with citizenry of both Canada and the United States, expanding intercontinental and new foreign trade will inure to the culture and wealth of the entire world.

HARRY R. HALL
Executive Vice President
Minneapolis Area Chamber of Commerce

We in Minneapolis believe the St. Lawrence Seaway will open a new era for this inland empire, and we also believe it

here's one filter press that pays its own way

Sperry Filter Presses can be made with new glass-reinforced Polyester plates and frames.

THE SPERRY FILTER PRESS

Because Sperry Filter Presses are custom engineered for *flexible, volume production* and *elimination* of *waste materials* and *man-hours*, you can expect—and get—more efficient filtration at less cost! With a Sperry Filter Press the low first cost is virtually the only cost! Installation, depreciation and maintenance are minimized; down-time, all but eliminated.

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Check 3535 opposite last page.

St. Lawrence Seaway

From preceding page

will open a new vista of beauty for the world to see. Many will want to view the source of the Mississipi River, a river that offers this area another transportation pathway to the Gulf of Mexico and joins with the Ohio and Missouri to form a network of inland waterways, with Minneapolis as its northern terminus.

We anticipate a large interchange of American-made goods with those of other countries of the world. Also, we see imports coming into this area from all parts of the world.

Opening of this fourth seacoast offers opportunity for Duluth to become one of the greatest ports in the world and that, in turn, offers opportunity for the many cities in the area, such as Minneapolis, to benefit immeasurably from the expanded travel and greater exchange of goods and services.

Senator STUART SYMINGTON
(D., Mo.)

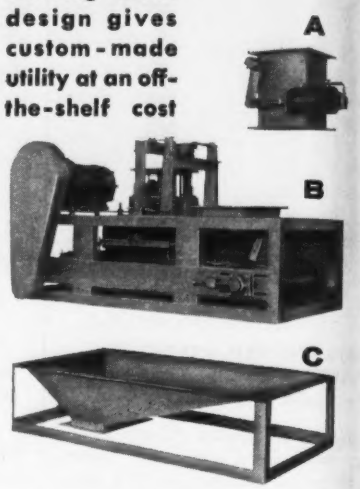
The broad benefit pattern (of the St. Lawrence Seaway) will be slow in emerging, as water shipping routes of many decades may not be changed overnight. However, the Seaway should prove helpful in the Middle West almost immediately. This applies particularly for the farm and industrial areas along the Missouri, Ohio, and Upper Mississippi Rivers. Many producers will have greater opportunities in the world market.

Water will become increasingly important to the industries of tomorrow. An economical method of transport is also necessary for efficient production. Therefore, access to water for production and for transportation will be a major factor in building future facilities or expanding present ones.

In Missouri, we look forward to sharing with all other states in the benefits of the St. Lawrence Seaway project.

UNITIZED WEIGHER-FEEDER

Building-block design gives custom-made utility at an off-the-shelf cost



UNITIZED construction makes the W-C Weigher-Feeder readily adaptable to practically any processing setup. Components are standardized, proven and interchangeable . . . pre-engineered with virtual "plug-in" simplicity.

A The UPPER FRAME controls material input, is supplied with a rotary feeder, sliding gate, vibratory feeder or other mechanism matched to material and flow requirements.

B The CONVEYOR FRAME, where material is weighed, includes a complete conveyor section, weighing pan and transmitter with integral tare adjustment. W-C's system of flexure mountings assures accurate measurement despite uneven loading or pile-ups. There are no knife-edges, beam pivots or other points of concentrated wear to affect accuracy.

C The LOWER FRAME is optional; can be a simple chute as shown.

In addition, the W-C Weigher-Feeder is designed to handle such instrument-controlled functions as flow totalizing, recording, programming, and material proportioning. Units are also available for installation on existing conveyors.

Complete information is given in Catalog 12. Write for a copy

W-C

S.A. 1667

WEIGHING and Control COMPONENTS, Inc.
206-A Lincoln Ave., Hatboro, Pa.

Check 3536 opposite last page.

CP Advisory Board

From page 28

outlined agenda becomes a "modus operandi" for a day-long meeting.

Members let the chips fall where they may when reviewing editorial staff efforts. Because of their depth of experience and knowledge of subjects covered in various sections of the magazine, opinions on how articles were presented serve as guideposts to the staff.

In appraising past issues, the board might ask a series of questions regarding "timeliness," "breadth of interest or novelty," "readability, arrangement, headline, illustration."

Here are a few comments that might be made at such a meeting. "Article stirred the imagination. Excellent presentation, and extremely well written, short, concise, and to the point. Would hold this particular editorial (story) up as a model of the type which CHEMICAL PROCESSING is doing."

Praiseworthy? Yes, but the EAB pulls no punches if it believes stories do not measure up. Criticisms are just as strong as any compliments.

The editorial staff accepts these criticisms as ideas, and uses them as guides for better editorial coverage.

On pages 28 and 29 are the names, titles, and photographs of present and past Editorial Advisory Board members. Although these men until now have been cloaked in anonymity, they have given unstintingly of time and effort to make CHEMICAL PROCESSING the leader that it is. Their work has been of immeasurable help in building the magazine's leadership.

The Editorial Advisory Board will continue to meet and discuss problems so that CHEMICAL PROCESSING can bring to you up-to-the-minute reports on management and business problems, chemical materials, new processing techniques, processing equipment, process instrumentation and laboratory apparatus, corrosion control, material handling and packaging, plant engineering, maintenance and safety, and ideas from other industries.

Accurate, reliable temperature control need not be expensive

By John W. Ritter, Test Engineer
Sarco Company, Inc.

Temperature regulation equipment for food processing should be simple to use and easy to maintain. It should be absolutely reliable for the protection of the product—and inexpensive enough to use economically.

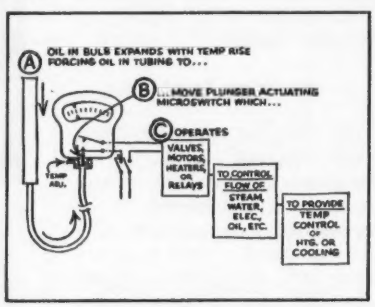
The satisfaction of these multiple demands is a matter of selecting controls that match the job, buying only the amount of control you need and no more.

A very good solution to this problem is the specification of a Sarco Electric Indicating Control. This type of control allows you a wide selection of ranges and adjustment within those ranges for your exact operating conditions.

The same unit can be used for controlling steam, water, or electricity and will regulate heating or cooling or both.

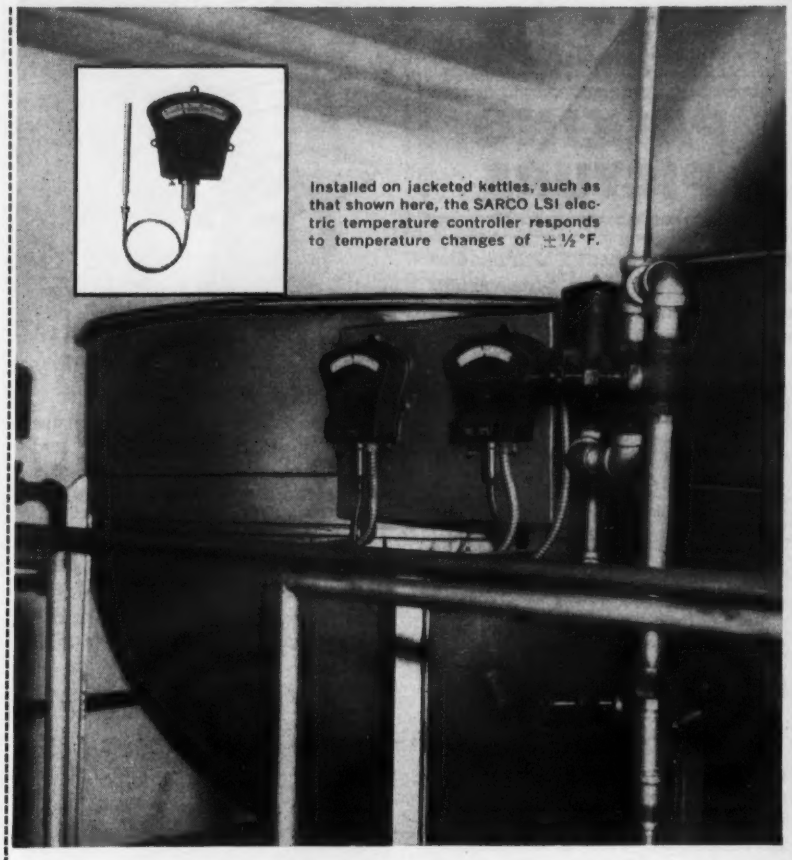
For additional flexibility in controlling heating or cooling, various interval timers and other control devices can be incorporated with Sarco Electric Indicating Temperature Regulators.

Sarco Electric Indicating Temperature Regulators include large easy-to-read dials with both actual and set temperatures on one scale, graduated in regular, even increments.


A OIL IN BULB EXPANDS WITH TEMP RISE FORCING OIL IN TUBING TO...
B ...MOVE PLUNGER ACTUATING MICROSWITCH WHICH...
C OPERATES
VALVES, MOTORS, HEATERS, OR RELAYS
TO CONTROL FLOW OF STEAM, WATER, ELEC., OIL, ETC.
TO PROVIDE TEMP CONTROL OF HTG. OR COOLING
TEMP ADJ.

This rough sketch shows how the Sarco LSI Electric Indicating Temperature Control can be used to actuate valves or relays, control flow or provide temperature control for heating or cooling.

In addition to simplicity and reliability, the Sarco control can be quite easily maintained by the regular maintenance crew, and its installation is a simple and inexpensive job.


Installed on jacketed kettles, such as that shown here, the SARCO LSI electric temperature controller responds to temperature changes of ±½°F.

You get the sensitivity you need—
in the range you need—with
reliable SARCO Electric Indicating Regulators

Sarco Electric Indicating Temperature Controllers are low in first cost, and they are inexpensive to install. They provide the sensitivity you need over the temperature range of *your* process. You get response to temperature changes of ±½°F. You change control settings simply by turning one knob. You get a continuous visual check on process temperature by reading both set and actual temperature on one large scale.

Sarco Electric Indicating Temperature Controllers are available for temperatures from 90°F. to 650°F., in operating ranges from 100°F. to 400°F. In addition, they offer many switch sequence combinations, such as step-heating, heating and cooling, and temperature control with the operation of visual or sound signaling devices.

Write today for our latest bulletin on Sarco Electric Indicating Controls. 6928-B

SARCO
COMPANY, INC.
635 Madison Ave., New York 22, N. Y.

TEMPERATURE CONTROLLERS • STRAINERS • STEAM TRAPS • HEATING SPECIALTIES

Check 3537 opposite last page.

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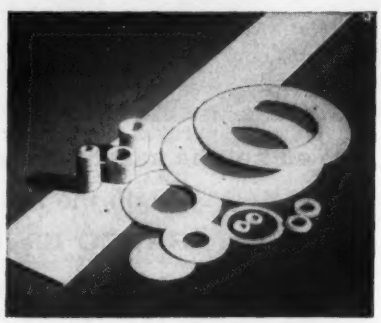
Style No. 4
WHITE ASBESTOS PACKING—for use against hydrochloric, muriatic and phosphoric acids, sulphurous and caustic alkali solutions, for temperatures up to 600 degrees F.

Style No. 5
BLUE ASBESTOS PACKING—for use against sulphuric, benzoic and hydrofluoric acids, caustics, ferric chloride, etc., for temperatures up to 550 degrees F.

"Teflon" Products – "Teflon" does not melt or flow, and is the finest material known for use against solvents, acids, alkalies, caustics, etc. Recommended over a temperature range from –80 to plus 500 deg. F. Tensile strength ranges between 1500 and 2500 P.S.I. Can be used in combination with other sealing materials. Furnished in molded rods, tubes, V rings, solid ring gaskets, sheet, envelope gaskets, tape, O rings, and braided forms.



Style T-5, impregnated packing. **Style T-5B,** braided packing.

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Check 3538 opposite last page.

Radioactive Waste

From page 27

sorbed and fixed unto montmorillonite clays. An additional benefit is the economic advantage of one waste-disposal source serving several reactors.

In solid forms such as these, relatively shallow disposals (6000-7000 feet) could be practical in excavations in crystalline rock, or in prepared cavities in thick shale beds, or in natural caverns and abandoned ore mines.

The big problems here are prevention of radioactive seepages to ground water, and the development of a "grout" curtain to contain the wastes, perhaps founded on some self-sealing principle which will utilize the thermal heat.

Since jointed and stratified rock caverns present so many leakage hazards, it would seem that the most promising method of high-level waste disposal might be in salt deposits, especially in salt domes. These exist in quantity along much of the Gulf Coast. Salt beds and mines are abundant along the south side of the Great Lakes.

One disposal technique which has not been suggested is the projection of wastes into outer space.

No Simple Solution

No method of high-level waste disposal can as yet be certified as infallible. Any method, if considered to be successful, must assure ultimate disposal — that is, guarantee safe, final return to nature. By safe is meant freedom from contact with any living thing. And this return must be undisturbed for a very long period of time. Another factor: The technique must be economic enough so as not to discourage continued nuclear energy development.

Nuclear-reactor metals are described, and processing, testing, and quality-control facilities shown in eight-page Tech Bul IND-20—General Plate Division, Metals & Controls Corporation, division of Texas Instruments Incorporated, Attleboro, Mass.

Check 3539 opposite last page.

Master PADLOCKS for chemical industries

Famous Master Laminated Padlocks
Multiple steel plates . . . stronger than a solid block! Genuine brass-cylinder, pin-tumbler security. No finer padlock protection.

Stainless Steel Combination Padlocks
Double-wall construction . . . 3 number brass locking mechanism. Available with "Key-Control" — one control key opens all locks.

Special Long or Short Shackles
For switch boxes, chains, truck or freight car doors, and other uses where special shackle lengths are more desirable.

Speedy Service on Keyed-Alike and Master-Keyed Sets
Master's Service Department is geared for fast delivery . . . in emergencies, special orders are on the way within hours!

Corrosion resistant: cadmium rust-proofed laminated steel; laminated brass case, solid brass shackles; stainless steel case on combination padlocks.

Write for Free Catalog

Master Padlocks

Master Lock Company, Milwaukee 45, Wis.
World's Largest Padlock Manufacturer

Check 3540 opposite last page.

new literature

Industrial bulletins pertinent to the reader . . . offering data on products, processes, services. Additional reviews of catalogs, bulletins, data sheet, etc., are found throughout other sections of this magazine

Calcium chloride is subject of 108-page booklet containing sections concerning properties and solutions, unloading and handling solid forms, unloading and handling liquors, suggested analytical methods and tentative specifications. Bul 16—Solvay Process Division, Allied Chemical Corporation, 61 Broadway, New York 6, New York.

Check 3541 opposite last page.

Storage battery facts is subject of 32-page booklet. Useful information for those who buy, specify, or work with storage batteries is presented. "Facts About Storage Batteries" — Exide Automotive Division, The Electric Storage Battery Co., P. O. Box TP 6266, Cleveland 1, Ohio.

Check 3542 opposite last page.

Twenty-four silanes are cataloged along with tables covering physical properties, products specifications, and shipping data in 16-page Booklet SF-1160—Silicones Division, Union Carbide Corporation, 30 E. 42nd St., New York 17, N.Y.

Check 3543 opposite last page.

Fastener metals' characteristics are tabulated, to show physical and mechanical properties and suitability for manufacturing applications, in 24-page Corrosion Guide —H. M. Harper Company, 8200 Lehigh Ave., Morton Grove, Ill.

Check 3544 opposite last page.

Checkweighing scales are illustrated and described in four-page bulletin. Literature covers specifications, operational principle, methods of application. "Thayer Checkweighing Scales" — Thayer Scale Corp., 1 Thayer Park, Pembroke, Mass.

Check 3545 opposite last page.

Hand rotary pumps of internal gear type are outlined in four, four-page Pump Folders A, B, C, and D—Industrial Division, The Wayne Pump Company, Division of Symington-Wayne Corporation, Ft. Wayne, Ind.

Check 3546 opposite last page.

Fork-truck engineering data, specifications, and operating information are included in condensed catalog. A section covers major attachments. Condensed Fork-truck Catalog — The Elwell-Parker Electric Company, 4205 St. Clair Avenue, Cleveland 3, Ohio.

Check 3547 opposite last page.

Electrical connectors are presented in 48-page bulletin, including assembly instructions and catalog listings. Bul 2711—Crouse-Hinds Company, Syracuse 1, N.Y.

Check 3548 opposite last page.

Nuclear instruments, including detectors, analyzers, and monitors, are cataloged with illustrations and complete data in 52-page Cat F—Tracerlab, 1601 Trapelo Rd., Waltham 54, Mass.

Check 3549 opposite last page.

Plug valves of cam-sealed type (32-2); quarter-turn, lever-sealed valves (39-3); and hydraulic-operating valves (39-6) are covered in Reference Books 39-2, 39-3, and 39-6—Homestead Valve Manufacturing Co., Coraopolis, Pennsylvania.

Check 3550 opposite last page.

Pail and drum linings of various kinds, for spraying on as protective interior coating, are covered in eight-page looseleaf brochure. Physical properties and methods of application are included. LEC Brochure—Lining Engineering Corporation, a division of Lithcote Corporation, 5000 W. Lake St., Melrose Park, Ill.

Check 3551 opposite last page.

Resistance elements for measuring temperatures to 1200°F under pressures to 4500 psig are depicted and explained in four-page Product Spec E51-6—Bailey Meter Company, 1050 Ivanhoe Rd., Cleveland 10, Ohio.

Check 3552 opposite last page.

Water sterilization systems, for production of sterile pyrogen-free boiler steam, is described in eight-page Bul IN201—Wilmot Castle Company, Box 629, Rochester 2, New York.

Check 3553 opposite last page.

Belt conveyors ranging from five to 60' lengths with belt widths from six to 48" are depicted in 12-page portfolio. Detail drawings and selection guide are included in "Incline-O-Belt Conveyors"—Sage Equipment Co., Inc., 30 Essex St., Buffalo 13, N.Y.

Check 3554 opposite last page.

Meter testers for field testing are considered in Critical Flow Prover Bul—American Meter Company, 920 Payne Ave., Erie, Pa.

Check 3555 opposite last page.

Packaged feed mill is described in colorful four-page bulletin. Large cutaway drawing illustrates 10 pieces of equipment used in the mill. Bul 459—Prater Pulverizer Company, 1515 South 55th Court, Chicago 50, Ill.

Check 3556 opposite last page.

Material containers made of welded wire for visible inventory, plus pallets and conveyor guards are exhibited along with specifications chart in Brochure B-100—Cargotainer Division, Tri-State Engineering Company, Washington, Pa.

Check 3557 opposite last page.

Material-handling equipment, power-rectification equipment, mechanical shaft seals, paper joggers, and portable construction tools are specified in 68-page Cat 591 — Syntron Company, 110 Lexington Ave., Homer City, Pa.

Check 3558 opposite last page.

Laboratory instruments of all types are delineated in 46-page booklet. Booklet 59—E.H. Sargent & Co., 4647 W. Foster Ave., Chicago 30, Illinois.

Check 3559 opposite last page.

Filter papers, their chemical and mechanical properties, and applications are given in four-page Bul 12—The National Filter Media Corporation, 1717 Dixwell Ave., New Haven 14, Conn.

Check 3560 opposite last page.

Tanks for water and effluent treatment, made of tile laid with corrosion-resistant mortar, are shown in four-page Bul AET-59 — Stebbins Engineering and Manufacturing Company, Watertown, N.Y.

Check 3561 opposite last page.

Screen separator with three-dimensional motion is described in two-page illustrated Bul SA 1101-12-58—Industrial Division, De Laval Separator Company, Poughkeepsie, N.Y.

Check 3562 opposite last page.

Centrifugal separations for process industries is topic of 16-page bulletin. Literature discusses design, operation, advantages of centrifugal separators for five basic liquids-solids applications. Bul 2606 — Dorr-Oliver Incorporated, Havemeyer Lane, Stamford, Conn.

Check 3563 opposite last page.

Acid-proof cements and their individual applications are explained in Bul 5-2—Atlas Mineral Products Company, Mertztown, Pa.

Check 3564 opposite last page.

Vibratory feeder, of electro-permanent-magnetic type, for variety of services in providing uniform rate of feed of bulk materials, is presented in Vibratory Fact File —Eriez Mfg. Co., 73-RA Magnet Drive, Erie, Pa.

Check 3565 opposite last page.

Laboratory apparatus of various types is detailed in 16-page Lab-Log 1-59—Will Corporation, Box 1050, Rochester 3, N.Y.

Check 3566 opposite last page.

Heat transfer and immersion heating are discussed in two four-page bulletins. Illustrations are included in Engineering Buls 1 & 2—Sellers Engineering Company, 4876 N. Clark St., Chicago 40, Illinois.

Check 3567 opposite last page.

Lab chromatographs for resolving and analyzing substances with boiling points as high as 600°C are depicted in Bul 1847—Consolidated Electrodynamics Corporation, 360 Sierra Madre Villa, Pasadena, Calif.

Check 3568 opposite last page.

Infrared spectrophotometer which automatically records data is delineated in new 20-page Bul 724—Beckman/Scientific and Process Instruments Division, Beckman Instruments, Inc., 2500 Fullerton Rd., Fullerton, Calif.

Check 3569 opposite last page.

Plastics guide to use in production, maintenance, and safety applications may be slipped into notebook. Plastics Guide—Commercial Plastics & Supply Corp., 630 Broadway, New York 12, N.Y.

Check 3570 opposite last page.

Code imprinter for conveyor-line use on cans, jars, and bottles is presented in Bul TB—Dept. M., Adolph Gottscho, Inc., Hillside 5, New Jersey.

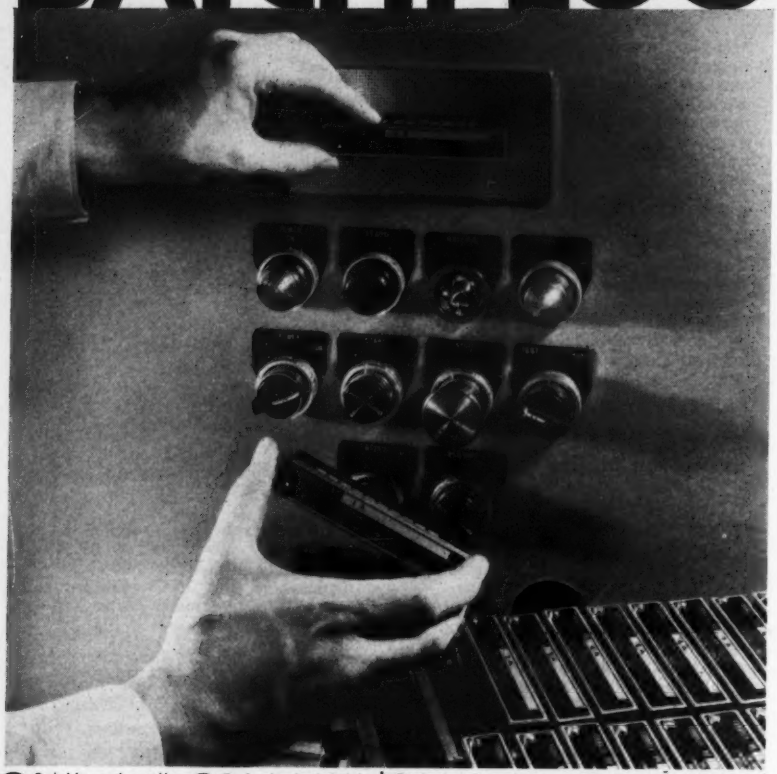
Check 3571 opposite last page.

Dry thermoplastic colorant line is presented in four-page Drycol Booklet—Gering Products, Inc., Kenilworth, N. J.

Check 3572 opposite last page.

NEW LOW COST AUTOMATIC BATCHING
WITH INSTANT FORMULA CHANGING

HOWE BATCHPLUG



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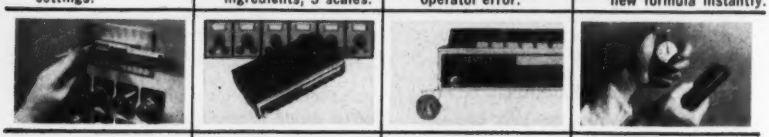
2 Each standard Batchplug controls up to 10 ingredients, 3 scales.

3 Sealed for privacy—no dials to reset—no operator error.

4 Inserting Batchplug changes entire plant to new formula instantly.



The Howe BATCHPLUG cuts panel and circuit costs—puts automatic batching in everybody's reach! Simple, rugged, easily set for any formula up to 10 ingredients. An exclusive Howe development!

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WRITE TODAY FOR OFFICE DEMONSTRATION OR NEW BATCHPLUG FOLDER

Check 3573 opposite last page.

NEW LITERATURE

Ethoxylated chemicals, their chemical properties and potential applications, are presented and 33 formulas given in Ethoxylated Chemicals Booklet — Derivatives Department, Armour Chemical Division, Armour Company, 1355 W. 31st Street, Chicago 9, Ill.

Check 3574 opposite last page.

Centrifugal, rotary pumps are delineated in 72-page catalog including specifications and drawings. Pump Cat—Pioneer Pumps, Paris Products Division, Detroit, Harvester Company, 21800 Greenfield Rd., Oak Park 37, Mich.

Check 3575 opposite last page.

Closed-circuit TV uses in industry are portrayed in four-page Bul 1194—Electronics Division, Diamond Power Specialty Corporation, P.O. 415, Lancaster, Ohio.

Check 3576 opposite last page.

Valves, of steam-pressure reducing power, are depicted in four-page Bul 600—Klipfel Valves, Inc., division of Hamilton-Thomas Corporation, Hamilton, Ohio.

Check 3577 opposite last page.

Caustic potash and its solutions are presented in a booklet incorporating data on unloading, handling and dissolving, along with various tables and wall chart on handling precautions. Bul 15—Solvay Process Division, Allied Chemical Corporation, 61 Broadway, New York 6, N.Y.

Check 3578 opposite last page.

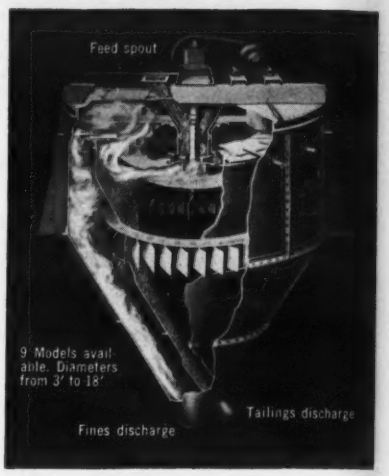
Plastic pipe, extruded of acrylonitrile-butadiene-styrene, is depicted in Plastic Pipe Bul—Marbon Chemical Division, Borg-Warner, Box 68, Washington, West Va.

Check 3579 opposite last page.

"This is the acid test."

Size Requirements Getting Tougher?

Sturtevant Air Separators Increase 40 to 400 Mesh Output as Much as 300%



Closed-circuit air separation is of proved advantage in reduction processes. Result is a better, more uniform product. Grinding mills perform at top efficiency, output frequently increases as much as 300%, power costs drop as much as 50%.

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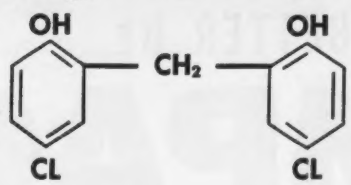
Check 3580 opposite last page.



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Check 3581 opposite last page.

surge pressure protection with SILENCE for the *Dramatic* **INLAND STEEL BUILDING** CHICAGO, ILL.

Globe-type valve for lines from 3" to 24"
Architects and Engineers: Skidmore, Owings & Merrill
General Contractor: Turner Construction Company
Refrigeration: Economy Plumbing and Heating Co.

By operating instantly when flow reversal starts or when flow is zero *Silent Check Valves* protect against damage from surge pressures . . . eliminate water hammer in this new 18-story stainless structure. *Write for Bulletins*—No. 654 on the Valves; No. 851 on Cause, Effect and Control of Water Hammer.

Williams-Hager *Silent* CHECK VALVES

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Check 3582 opposite last page.

NEW LITERATURE

Silicone products and uses are highlighted in eight-page Cat CDS-129A — Silicone Products Department, General Electric Company, Waterford, N.Y.

Check 3583 opposite last page.

Vibrating screens—a selection of 12 types in 212 sizes—are cataloged and illustrated in 48-page Book 2777—Dept PR, Link-Belt Company, Prudential Plaza, Chicago 1, Ill.

Check 3584 opposite last page.

Magnetic plates and grates, providing protection against tramp iron, are topics of Bul 1072-B—Stearns Magnetic Products, Division of The Indiana Steel Products Company, 635 S. 28th St., Milwaukee 46, Wis.

Check 3585 opposite last page.

Industrial chemical line is listed in six-page Special-purpose Chemical Cat—Nuodex Products Company, Division of Heyden Newport Chemical Corporation, Elizabeth, New Jersey.

Check 3586 opposite last page.

For more information on developments reported in this section, check corresponding numbers on Reader Service Slip opposite last page of this issue.

Filtration of condensates as part of high-rate condensate scavenging process, is discussed in eight-page Tech Reprint P-172—Graver Water Conditioning Co., division of Union Tank Car Company, 216 West 14th St., New York 11, N.Y.

Check 3587 opposite last page.

Gages of Grades AA (400 and 1819), A (305), and 3 (64A), are depicted in Cats 64A, 305, 400 and 1819—United States Gauge, Division of American Machine and Metals, Inc., Sellersville, Pa.

Check 3588 opposite last page.

Teflon-coated glass yarns are analyzed and data detailed in Teflon-Coated Glass Yarns booklet — Chemo Products, Inc., West Warwick, R. I.

Check 3589 opposite last page.

Packaged substations are discussed comprehensively, including coverage of basic design, applications, and specifications, in 16-page Bul R-5604-1A—I-T-E Circuit Breaker Company, 1900 Hamilton St., Philadelphia 30, Pa.

Check 3590 opposite last page.

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The Cleveland Vibrator Company presents: Cleveland's new vibrating feeders and conveyors to handle your difficult-to-move bulk chemicals—safely—surely—accurately.

Only one moving part. Mounting is easy, no springs to tune . . . and the cost is surprisingly low.

Variable flow completely controlled, with instant start and stop.

Write today for complete information and prices.

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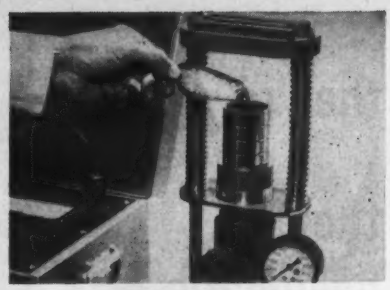
Cleveland 13, Ohio

Check 3591 opposite last page.



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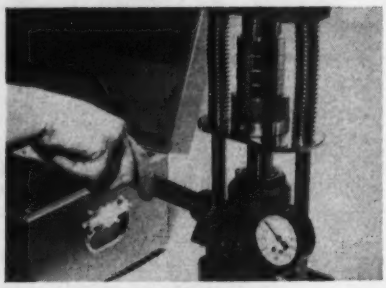

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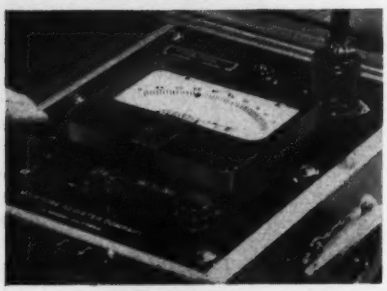

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Check 3592 opposite last page.

NEW LITERATURE

Non-lubricated plug valves, which use two Teflon O-rings in the face of the plug to provide positive shut off, are described in four-page bulletin. "Wedgeplug" — Wedgeplug Valve Company, Div. of Stockham Valves and Fittings, Birmingham 2, Alabama.

Check 3593 opposite last page.

Chemical pumps for non-segmented, non-aerated flows; shear-sensitive emulsions; and auto-detonating fluids are described in All-Chem Pump Bul—Eco Engineering Company, 12 New York Ave., Newark, N.J.

Check 3594 opposite last page.

Film-badge service, including types of badges and evaluation and control methods utilized, is described in eight-page Film Badge Service Booklet—R. S. Landauer, Jr. & Company, 3920 216th St., Matteson, Ill.

Check 3595 opposite last page.

Welding fittings and flanges are presented in material-selection guide. Specifications, analyses, effects of alloying elements, mechanical properties, and arc-welding procedures also are covered in 12-page Cat FB-78—Welding Fittings Department, Tubular Products Division, The Babcock & Wilcox Company, Beaver Falls, Pa.

Check 3596 opposite last page.

Mn wrought iron's characteristics, at sub-zero temperature and under corrosive conditions, are outlined in "Byers Mn Wrought Iron"—A. M. Byers Company, Box 1076, Pittsburgh 30, Pa.

Check 3597 opposite last page.

Water analysis booklet of 80 pages summarizes methods of analyzing water for municipal and industrial use. Bul 11—Solvay Process Division, Allied Chemical Corporation, 61 Broadway, New York 6, N.Y.

Check 3598 opposite last page.

Rotary feeder choice is subject of four-page technical bulletin that contains sectional drawings and a flow chart which depicts five different possible feeder applications. Bul I-43—Sprout, Waldron & Co., Inc., 130 Logan St., Muncy, Pa.

Check 3599 opposite last page.

Seven plasticizers for nontoxic applications are described in tables of comparative performance data given in Plasticizers booklet — Organic Chemicals Division, Monsanto Chemical Company, 800 N. Lindbergh Blvd., St. Louis 66, Mo.

Check 3600 opposite last page.

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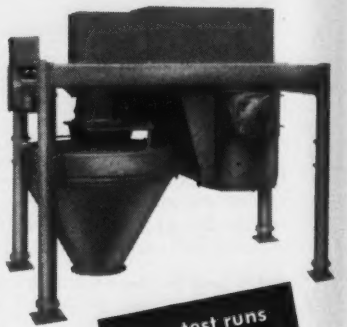
For closely controlled particle size reduction, minimum temperature rise, high abrasion resistance and low horsepower requirements with no grinding tolerances to maintain.

RECENT APPLICATION

Grinding raw glass scrap to 95% minus 16 mesh. Entoleter® Impact Mill with wear resistant impactors for economical tonnage processing of this extremely abrasive material.



- **Vibrating Screens**
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Send for complete literature.

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Check 3601 opposite last page.

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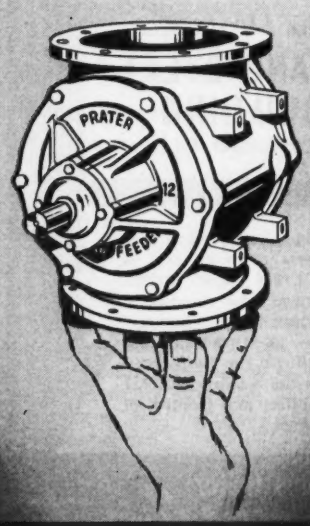
ROTARY AIRLOCK FEEDERS

for DUST CONTROL and PNEUMATIC CONVEYING



WRITE FOR BULLETIN P58

PRATER PULVERIZER COMPANY
1513 South 55th Court • Chicago 50, Illinois

Check 3602 opposite last page.

NEW LITERATURE

Cylindrical pallet box of wire-bound construction is depicted in two-page sheet. Photographs show construction, how boxes are used in shipping bulk materials without loss. Bul CP-581—General Box Company, 1825 Miner St., Des Plaines, Ill.

Check 3603 opposite last page.

Chlorine bleach solutions are covered in 68-page booklet incorporating information on hypochlorous acid and its salts, various types of industrial bleach liquors, bleach-liquor preparation, equipment and methods of operation. Bul 14—Solvay Process Division, Allied Chemical Corporation, 61 Broadway, New York 6, N.Y.

Check 3604 opposite last page.

Electric weighing systems for tanks, bins, hoppers, conveyors, cranes, and platforms are presented in Bul W-100—Gilmore Industries, Inc., 13015 Woodland Ave., Cleveland 20, Ohio.

Check 3605 opposite last page.

Industrial-floor cleaning is discussed in eight-page Industrial-floor Booklet—Oakite Products, Inc., 19 Rector St., New York 6, New York.

Check 3606 opposite last page.

Aluminum cans in 335 standard stock sizes—from 11/16 to 25" diam—are specified in eight-page Cat B—American Aluminum Company, Mountainside, N. J.

Check 3607 opposite last page.

Analyzers—photometric, oxygen-trace, thermal-conductivity, and combustibles—are presented in Analyzers Bul—Analytic Systems Company, 980 N. Fair Oaks Ave., Pasadena, Calif.

Check 3608 opposite last page.

Spray nozzles for spraying liquids in small to medium quantities are described in illustrated four-page bulletin. Photos show liquid spray distribution patterns delivered by four nozzle styles at several supply pressures. Bul 6A-622-2 — Schutte and Koerting Company, Dept. JA-19, Cornwells Heights, Bucks County, Pa.

Check 3609 opposite last page.

Asbestos packing of white type, for use against hydrochloric, muriatic and phosphoric acids, and of blue type, for use against sulfuric, benzoic and hydrofluoric acids, is described in Asbestos Packing Cat—The Allpax Company, Inc., 160 Jefferson Ave., Mamaroneck, N.Y.

Check 3610 opposite last page.

"finger-flexible" Teflon*-lined hose in larger diameters!

Only TITEFLEX has it! Its name: Springfield "400"**

For the first time you can buy Teflon hose that *really* flexes, even in *large* diameters. TITEFLEX makes it with an exclusive process, and its minimum bend radius is only 3⅛ times the hose diameter!

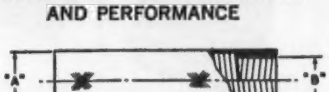
CHECK THESE WANTED FEATURES:

- Often, a shorter Springfield "400" assembly can replace extruded hose at a saving in money.
- Available in lengths to 25 feet (soon to 50!) and diameters of ¾", 1", 1¼", 1½", 2"—and soon—3" and 4".
- Teflon is tough, friction free, lightweight, inert, corrosion and temperature resistant, with extra long fatigue life.
- Reinforced with TITEFLEX "zero motion" braiding.
- Assembly terminations: Elbow fittings of any configuration to your order. JIC Swivel Nuts and Male Pipe Threads, AN Swivel Nuts, MS 20756 Flanges. All guaranteed failure-proof to burst pressure of hose.

Already, Springfield "400" is in use for transferring acids, alcohols, methanol and most corrosive fluids . . . for live steam lines . . . for extremely high and low temperature systems. Our data sheets contain answers to your needs. Get a copy from your TITEFLEX distributor or write direct to us. Stocks available at authorized distributors in your area.

*Teflon is a duPont trademark **T.M. of Titeflex, Inc., Pat. Pending

SPRINGFIELD "400" DIMENSIONS AND PERFORMANCE



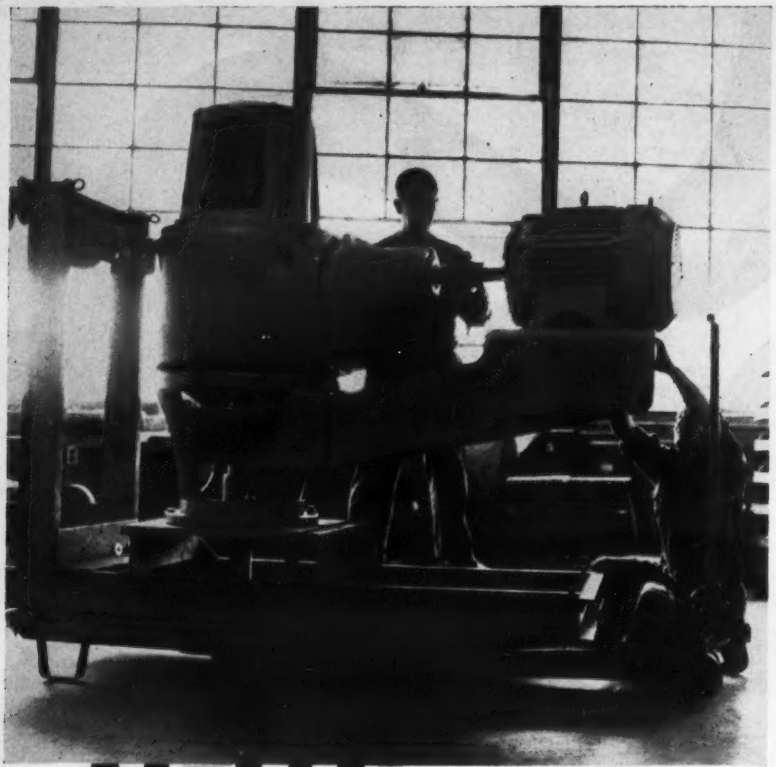
(Hose assemblies rated for performance at operating pressures shown—through temperature range of −65° to 400° F.)

Nom. Size	"B" Inside Dia.	"A" Outside Dia.	Approx. Weight Lbs/Ft	Min. Bend Radius	PRESSURE, P.S.I. Min. Burst.	Max. Test	Max. Working
¾"	.784	1.067	.34	2½"	2,000	1,000	500
1"	.992	1.262	.40	3½"	2,000	1,000	500
1¼"	1.290	1.555	.50	4"	1,400	700	350
1½"	1.522	1.790	.60	5"	1,000	500	250
2"	1.987	2.315	.94	6¾"	1,000	500	250

titeflex

titeflex inc. springfield mass. PACIFIC DIVISION • SANTA MONICA • CALIFORNIA

Check 3611 opposite last page.



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Fast delivery on mixers this big

Why wait months when you need a turbine-type fluid mixer as hefty as this one?

You can get delivery of the new "5" Size LIGHTNIN Mixer shown here *in a few weeks.* That's because the speed reducer and other component parts are in stock at the factory, ready to assemble to your order.

Ratings range from 10 to 150 hp. And, at lower cost than ever for a mixer of this rating spread, you get these standard LIGHTNIN Mixer advantages:

1. Choice of 15 standard *interchangeable* speeds, 16.5 to 280 rpm.

2. Simple, on-the-tank conversion from double to triple reduction should process requirements change.

3. Gearing protected from shaft shock loads by unique hollow-quill construction.

4. Positive splash lubrication.

5. Complete weatherproofing protection.

For details, call your LIGHTNIN Mixer representative now. You'll find his name in Chemical Engineering Catalog, and under "Mixers" in the yellow pages of your telephone directory. Or write us direct.

Lightnin® Mixers

MIXCO fluid mixing specialists

MIXING EQUIPMENT Co., Inc., 185-h Mt. Read Blvd., Rochester 3, N.Y.
In Canada: Greey Mixing Equipment, Ltd., 100 Miranda Avenue, Toronto 19, Ont.

Check 3612 opposite last page.

NEW LITERATURE

Liquid chlorine and bleach analysis is considered in 72-page booklet which covers liquid chlorine, sodium hypochlorite, calcium hypochlorite, and information concerning reagents, indicators and standard solutions. Bul 12—Solvay Process Division, Allied Chemical Corporation, 61 Broadway, New York 6, N.Y.

Check 3613 opposite last page.

Air space filters are illustrated, their performance, construction, and installation data given in eight-page Brochure 1505-6 — Mine Safety Appliances Company, 201 North Braddock Ave., Pittsburgh 8, Pa.

Check 3614 opposite last page.

Wire-rope blocks specifications, tonnage capacities, and recommended wire-rope sizes for blocks and sheaves, are included in General Cat, Section I—Sauerman Bros., Inc., 620 S. 28th Ave., Bellwood, Ill.

Check 3615 opposite last page.

Automatic control panels of packaged type for gas-engine-driven compressors, are analyzed in nine-page Bul 170—Clark Bros. Co., One of the Dresser Industries, Olean, N. Y.

Check 3616 opposite last page.

Laboratory apparatus, instruments, appliances, and glassware are cataloged in profusely-illustrated, 80-page volume which will be sent to persons requesting it on company letterhead. Cat 59—Scientific Glass Apparatus Co., Inc., Bloomfield, New Jersey.

Controlled-volume pumping general introduction and discussion is contained in Bul 553-1—Milton Roy Company, 1300 E. Mermaid Lane, Philadelphia 18, Pa.

Check 3617 opposite last page.

Ferrocene characteristics and specifications are detailed in two-page Ferrocene Data Sheet—Matheson Coleman & Bell, division of The Matheson Company, Inc., Norwood 12, Ohio.

Check 3618 opposite last page.

Completely automatic centrifugal, with variable speed and time adjustments to provide flexible programming, is discussed in Batch-O-Matic Literature—Tolhurst Centrifugals, Division of American Machine and Metals, Inc., East Moline, Ill.

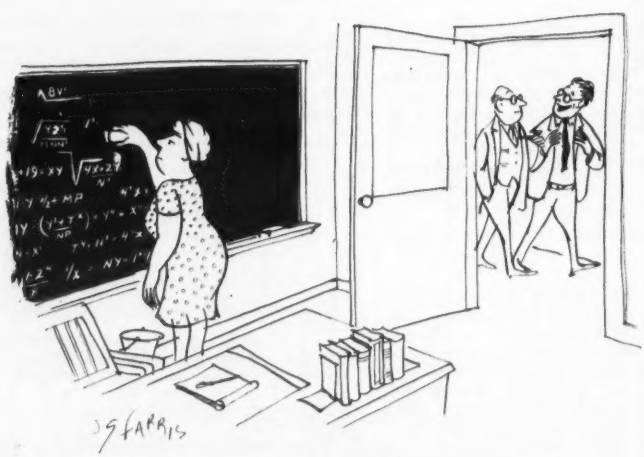
Check 3619 opposite last page.

Drafting equipment including new and improved products is delineated in 24-page Cat GC-59—Stacor Equipment Company, 285 Emmet St., Newark 5, N.J.

Check 3620 opposite last page.

Walkie vs rider trucks—Pros and cons for both the walkie and rider type industrial trucks are presented in eight-page brochure. Illustrations show how both can be used; check list provides facts to consider when analyzing truck requirements. Walkie or Rider Trucks Brochure—Automatic Transportation Company, Division of The Yale & Towne Manufacturing Company, 149 W. 87th St., Chicago, Ill.

Check 3621 opposite last page.



"Come see. I finally solved the problem!"

THAT'S INTERESTING

Heat shield

Corning Glass Works has developed a plate glass shield which reflects 65% of long-wave infrared. Window of tempered Pyrex glass is covered with a thin, transparent film. Heat literally bounces off the coating, which is permanently bonded to the glass. Glass itself does not become hot.

Quick-acting anesthetic

Methohexital, a new synthesized drug used as an ultra-short-acting anesthetic, has been developed by Eli Lilly and Company. It is said to have great potency and give rapid recovery from anesthesia.

Company says it would have its greatest use in brief surgical procedures on outpatients. Drug is not yet commercially available.

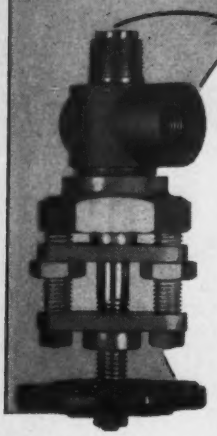
For more information on product at right, specify 3622 see information request blank opposite last page.

Swagelok® engineers believe that NO fitting is too good if it keeps your plant in operation

A tube fitting is small in size but large in importance when you consider that the most minute leak in a system can cause the shutdown of a multi-million dollar plant. Swagelok Tube Fittings represent more than a mechanical necessity. **They are an investment in security**... the type of solid security which results from the use of the finest fittings assuring constant trouble-free, leak-proof operation.

Crawford Fitting Company • 884 East 140th St. • Cleveland 10, Ohio
Crawford Fittings (Canada) Ltd., Niagara Falls, Ontario, Canada

New! Jerguson Drain or Sampling Valve



- completely self-draining
- withstands severe conditions
- foolproof operation

The new Jerguson No. 23 Drain or Sampling Valve is completely self-draining, for the valve stem seats on the outside of the valve body. It is ideal for installations where it is desirable to have the valve seat inside the wall of the vessel in order to prevent the typical condition of liquid remaining in the nipple and valve inlet.

This rugged, new Jerguson Valve has outside screw and yoke construction to meet high temperature or corrosive conditions where inside threads cannot be tolerated. The efficient outside thread design eliminates possible freezing and allows the valve stem to work freely at all times. The No. 23 Valve provides foolproof operation because the stem is constructed with a left-hand thread, thus allowing the valve handle to operate in the normal direction of standard valves.

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Check 3624 opposite last page.

NEW LITERATURE

Plastic pumps, designed without stuffing box or shaft seals, are depicted in Plastic Pumps Cat—Vanton Pump & Equipment Corp., Div. of Cooper Alloy Corp., Hillside, N.J.

Check 3625 opposite last page.

Filtration systems, including various filters, vacuum stills, separators, and flotation devices, is depicted in six-page Bul FB-106—Industrial Filtration Division, U. S. Hoffman Machinery Corporation, Thompson Road Plant No. 1, Syracuse, N.Y.

Check 3626 opposite last page.

Heating elements of the sprayed-on film type are described along with engineering data, charts, and graphs in 12-page Cat HB 3-359—Electrofilm, Inc., PO Box 106, North Hollywood, Calif.

Check 3627 opposite last page.

Styrene-methyl methacrylate copolymers for uses requiring crystal clarity, heat resistance, improved physical properties, outdoor weatherability, and light stability are discussed in Zerlon 150 Bul—Plastics Department, The Dow Chemical Company, Midland, Mich.

Check 3628 opposite last page.

High-pressure gages, including large-chamber reflex and heated or cooled types, are tabulated in High-pressure Gage Cat—Strahman Valves, Inc., 16 Hudson St., New York 13, N.Y.

Check 3629 opposite last page.

Constant temperature cabinets including ovens, incubators, sterilizers, and special purpose models are cataloged in 32-page Freas Cat—Precision Scientific Co., 3737 W. Cortland St., Chicago 47, Ill.

Check 3630 opposite last page.

Calcium chloride in refrigeration is reviewed in 64-page booklet which treats properties, preparation and maintenance and industrial applications of calcium chloride brines. Bul 4—Solvay Process Division, Allied Chemical Corporation, 61 Broadway, New York 6, N.Y.

Check 3631 opposite last page.

Fluorinated compounds — waxes, oils, and greases—are examined in 12-page brochure which includes fold-out A.S.T.M. standard viscosity-temperature charts. Fluorinated Compounds Brochure—Halocarbon Products Corporation, 82 Burlews Court, Hackensack, New Jersey.

Check 3632 opposite last page.

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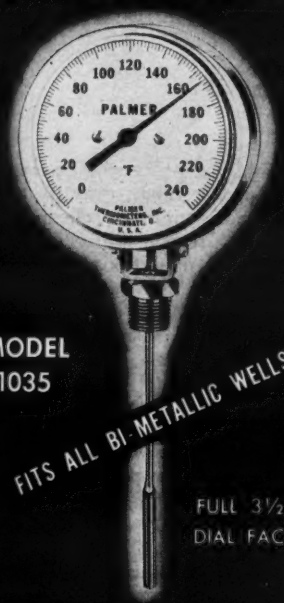

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Check 3635 opposite last page.

NEW LITERATURE

Roller and wheel conveyors, both light- and heavy-duty wheels, and rollers ranging from 1⅜ to 6½" diameter with up to eight-ton capacity are covered in 72-page Cat 158—Mathews Conveyor Company, Ellwood City, Pa.

Check 3636 opposite last page.

Industrial wire cloth, of various metals including titanium, is specified in 94-page Wire Cloth Cat—Dept. F, Cambridge Wire Cloth Co., Cambridge 5, Md.

Check 3637 opposite last page.

Heat sealer, of bench-type foot-operated design, is subject of two-page bulletin. Unit handles most sealable thermoplastic materials. Comet 54 UL Sheet—Product Packaging Engineering, 5713 Joanne Place, Culver City, Calif.

Check 3638 opposite last page.

Liquid feeders which meter, regulate, and feed minute amounts of liquid chemicals are described in Spec 70M2011—Fischer & Porter Company, 96 Jacksonville Rd., Hatboro, Pa.

Check 3639 opposite last page.

Liquid chlorine properties, handling and transportation equipment are included in 60-page Bul 7—Solvay Process Division, Allied Chemical Corporation, 61 Broadway, New York 6, N.Y.

Check 3640 opposite last page.

Centrifugal oil separators of heavy-duty type are presented in eight-page bulletin which incorporates cross-sectional diagrams. Bul 2141—Centrico, Inc., 75 W. Forest Ave., Englewood, N.J.

Check 3641 opposite last page.

Material-handling films available from member-companies are cataloged in 16-page booklet, "Industrial Material Handling Films"—The Material Handling Institute, Inc., One Gateway Center, Pittsburgh 22, Pa.

Check 3642 opposite last page.

Defoamer and coupler uses for 2,-6,8-trimethyl-4-nonanol are among data given in 2,6,8-Trimethyl-4-Nonanol Bul—Union Carbide Chemicals Company, division of Union Carbide Corporation, 30 E. 42nd St., New York 17, N.Y.

Check 3643 opposite last page.

Centrifugal mills and mixers and vibrating screens are covered in Impact Mill Literature—Entoleter, Division of Safety Industries, Inc., Box 904, New Haven, Conn.

Check 3644 opposite last page.

Nerco-Niro Spray Dryers now in operation at Dodge & Olcott are playing an important role in the processing of aromatic chemicals and perfume bases. Solutions containing the liquid essence pass through spray dryers where instantaneous evaporation produces dry products of exceptional uniformity in chemical and physical characteristics. This "Gentle-ized" method of rapid drying captures all of the original fragrance and chemical properties in infinitesimal particles and preserves them until time of use.

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IN CANADA: Safety Supply Co., Toronto

Check 3647 opposite last page.

NEW LITERATURE

Belt pulleys of cast iron are delineated in Bul 32-D—Sprout, Waldron & Co., Inc., Muncy, Pa.

Check 3648 opposite last page.

Viscosity determination and control reprints now available are itemized in Data Sheet 091-B—Brookfield Engineering Laboratories, Inc., Stoughton, Mass.

Check 3649 opposite last page.

Clay products for clinical-conditioning applications are delineated in four-page Tech Bul 1002—Minerals & Chemicals Corporation of America, Menlo Park, New Jersey.

Check 3650 opposite last page.

Drain or sampling valve is depicted in Data Unit—Jerguson Gage & Valve Company, 100 Adams St., Burlington, Mass.

Check 3651 opposite last page.

Butynediol is reviewed in conjunction with discussion of physical and chemical properties, and applications in 40-page Butynediol Booklet—Antara Chemicals, division of General Aniline & Film Corporation, 435 Hudson St., New York 14, N.Y.

Check 3652 opposite last page.

Pressure switches are presented with details on operating and electrical characteristics, ordering chart, parts blow-ups of models, other charts and tables in Cat PS 59-60—Pressure Switch Division, Barksdale Valves, 5125 Alcoa Ave., Los Angeles 58, Calif.

Check 3653 opposite last page.

Packaging and shipping ideas fill 48-page booklet. Photographs show applications and steel strapping equipment for putting these methods into action. Cat 19—Signode Steel Strapping Company, 2600 North Western Ave., Chicago 47, Ill.

Check 3654 opposite last page.

Water treatment in industrial and municipal situations is delineated in 92-page booklet including discussions of water purification, and water softening by means of zeolite and lime-soda processes. Bul 8—Solvay Process Division, Allied Chemical Corporation, 61 Broadway, New York 6, N.Y.

Check 3655 opposite last page.

Imidazole derivatives and process for producing them are treated in Imidazole Bul — Houdry Process Corporation, 1528 Walnut Street, Philadelphia 2, Pa.

Check 3656 opposite last page.

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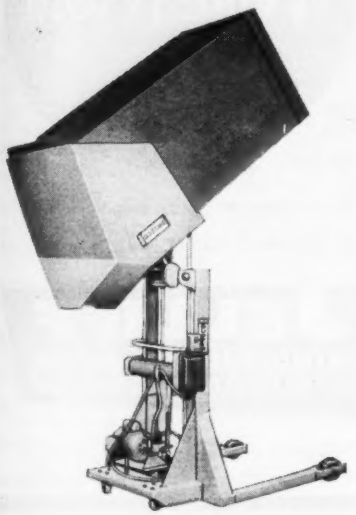

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Check 3657 opposite last page.

NEW LITERATURE

Vertical pumps for handling molten chemicals and horizontal type for black-liquor and caustic evaporator service are depicted in Bul V-837—Taber Pump Company, 291 Elm St., Buffalo 3, N.Y.

Check 3658 opposite last page.

Weight indicator which shows deviations in terms of dial scale divisions is described in Bul 58B—Richardson Scale Company, Clifton, N.J.

Check 3659 opposite last page.

Amino-functional silanes which have ability to couple organic and inorganic materials are introduced in Silicone Notes—Dow Corning Corporation, Midland, Mich.

Check 3660 opposite last page.

Stainless steel fittings for Schedules 5 and 10 pipe are listed in Speedline Cat—Horace T. Potts Co., 502 E. Erie Ave., Philadelphia 34, Pa.

Check 3661 opposite last page.

Environmental test chambers for variety of conditions are covered in 12-page Cat 59—American Research Corporation, Farmington, Conn.

Check 3662 opposite last page.

Graphic systems for recording production, scheduling, sales, traffic, and inventory information are presented in 24-page illustrated Booklet AA-10—Graphic Systems, 55 W. 42nd St., New York 36, N.Y.

Check 3663 opposite last page.

Mechanical seals are cataloged with complete information on selection and application, and illustrated with cut-away drawings in 20-page Cat 480—Durametallic Corporation, Kalamazoo, Mich.

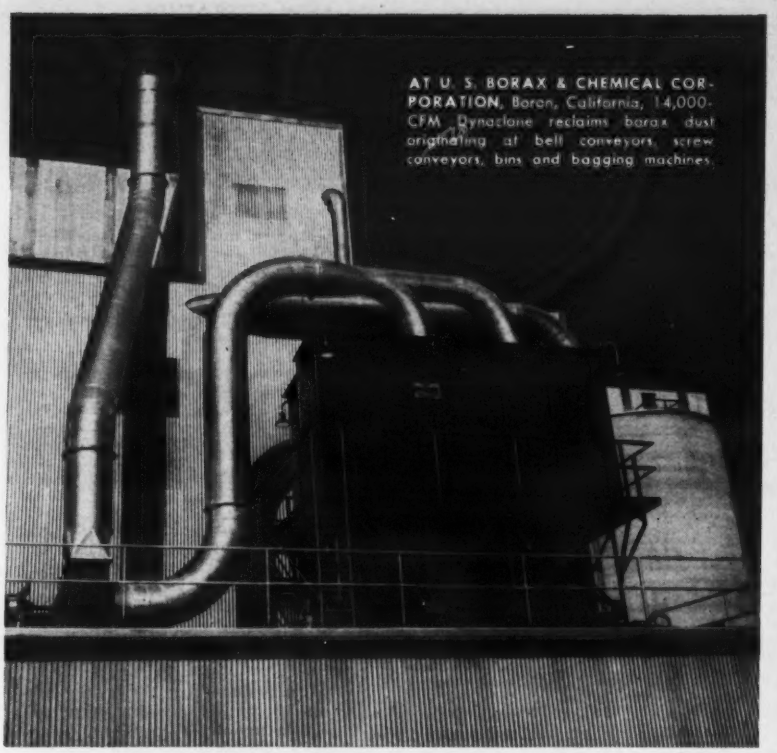
Check 3664 opposite last page.

Multi-purpose dumper catalog makes full use of pictures to show applications in various industries, as well as how equipment can be adapted to handle bags, boxes, bulk materials, and drums. Specifications and drawings are included. Multi-purpose Dumper Cat—Essex Conveyors, Inc., 165 Franklin Ave., Nutley 10, N.J.

Check 3665 opposite last page.

Welded steel tubing, both carbon and stainless, is covered in 12-page "Welded Steel Tubing" — The Formed Steel Tube Institute, 850 Hanna Building, Cleveland 15, Ohio.

Check 3666 opposite last page.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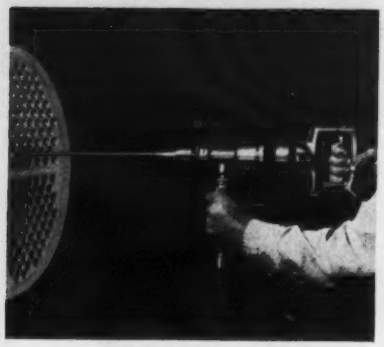

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EUROPEAN PLANT: Vlaardingen, The Netherlands

CANADIAN PLANT: Brantford, Ontario

Check 3668 opposite last page.

NEW LITERATURE

Steam traps are delineated in Steam Trap Book—Yarnall-Waring Co., 125 Mermaid Ave., Philadelphia 18, Pa.

Check 3669 opposite last page.

Glas-flow meters are presented in Bul 178 — National Instrument Laboratories, Inc., 828 Evarts St., N.E., Washington 18, D.C.

Check 3670 opposite last page.

Analysis of alkalis is treated in great detail in 80-page Bul 9—Solvay Process Division, Allied Chemical Corporation, 61 Broadway, New York 6, N.Y.

Check 3671 opposite last page.

Cold soda pulp manufacture from eucalypt woods in Australia is reviewed in Bul P-46—Sprout, Waldron & Company Inc., 130 Logan St., Muncy, Pa.

Check 3672 opposite last page.

Nickel-base alloy properties are detailed in 12-page Hastelloy Alloy N Bul—Haynes Stellite Company, Division of Union Carbide Corporation, 420 Lexington Ave., New York 17, N.Y.

Check 3673 opposite last page.

Progressing cavity pumps for use with problem chemicals are introduced in Bul 40 CP—Robbins & Myers, Inc., Springfield, Ohio.

Check 3674 opposite last page.

Filter elements are pictured with cross-section and microscopic photos, plus application and performance data, in four-page Cat BFD-48—Bendix Filter Division, Bendix Aviation Corporation, 434 W. 12 Mile Rd., Madison Heights, Michigan.

Check 3675 opposite last page.

PVC pipe, sheets, rods, and other fabricated parts are pictured in 12-page bulletin including chemical resistance tables. PVC Bul—Industrial Plastics and Bearings Division, Joseph T. Ryerson & Son, Inc., Box 8000 A, 2558 W. 16th St., Chicago 8, Ill.

Check 3676 opposite last page.

Lubrication selection chart is incorporated in four-page Bul 121—The Alpha-Molykote Corporation, Stamford, Conn.

Check 3677 opposite last page.

Thixotropic paste adhesive based on epoxy resins is introduced in Bul 2527 — Houghton Laboratories, Inc., Olean, N.Y.

Check 3678 opposite last page.

To page 166

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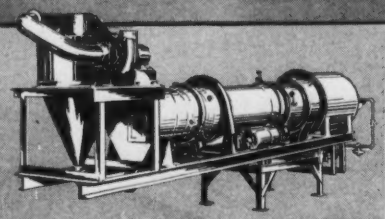

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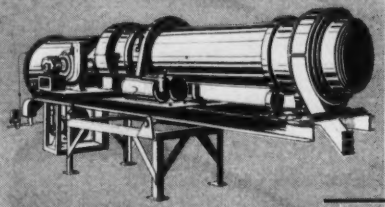

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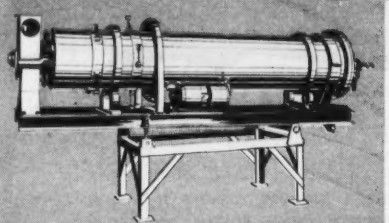

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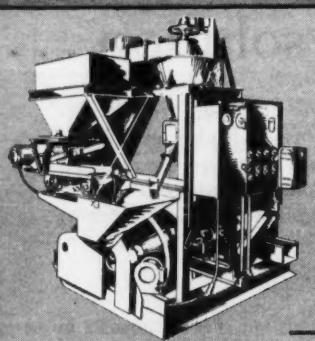

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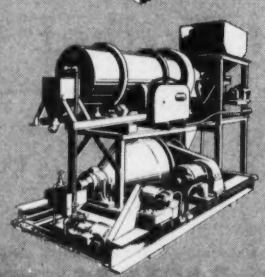

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Power and water connections only are needed to put the Hardinge wet grinding unit into operation. Self-contained and portable, 6½' high. Includes Conical Mill, Counter-Current Classifier, launders, feeder, pump and "Electric Ear" grinding control. Bulletin AH-448.

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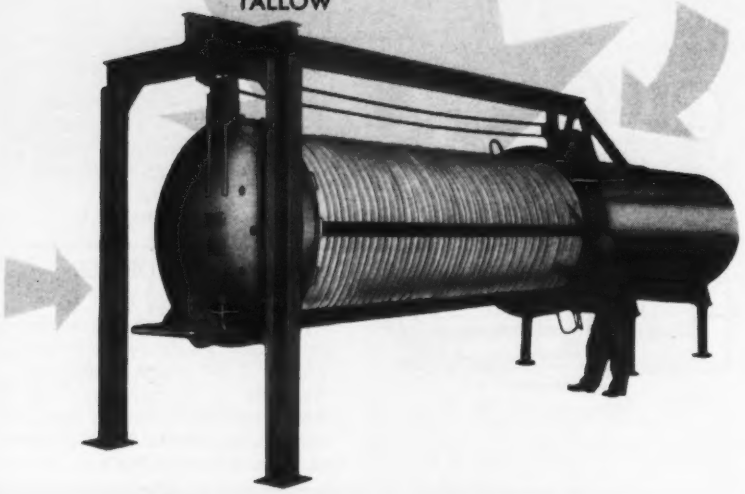

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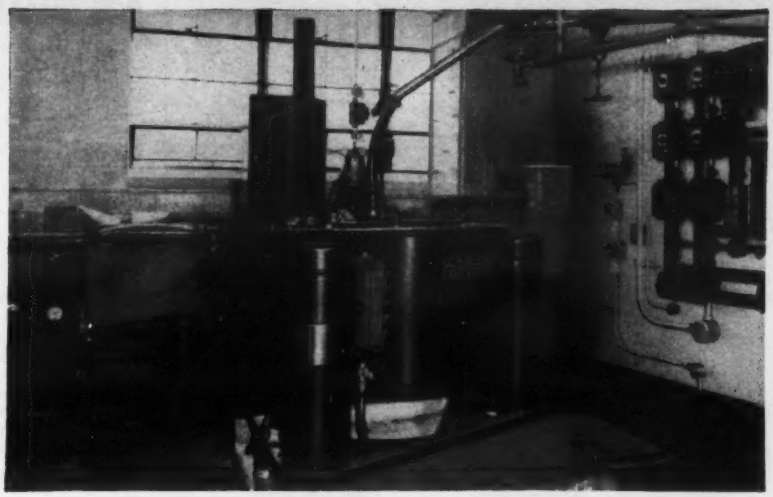

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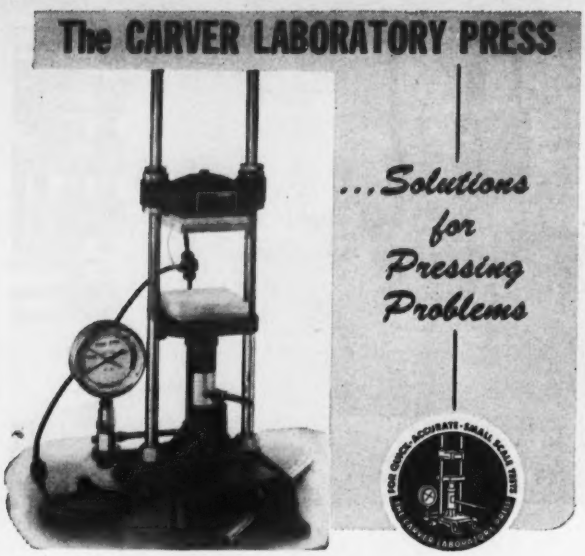

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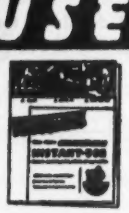

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NEW LITERATURE

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Soda ash booklet of 72 pages outlines in detail various aspects of this material. Bul 5—Solvay Process Division, Allied Chemical Corporation, 61 Broadway, New York 6, N.Y.

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Metering pumps which meter fluids at "micro" flow rates in response to automatic signals from pneumatic control instruments are listed with complete details in Bul 500-A—Process Equipment Division, Lapp Insulator Company, Inc., 102 Hall St., Le Roy, N.Y.

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Power-transmission machinery line is reviewed in eight-page Bul A-706—Dodge Manufacturing Corporation, Mishawaka, Ind.

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Thermowells are discussed and illustrated in Thermowell Cat—Trinity Equipment Corporation, Cortland, N.Y.

Check 3689 opposite last page.

Attrition mills for processing friable materials are discussed in data sheet. Double- and single-disc units are covered. Complete specifications are included. Attrition Mill Data Sheet — Munson Mill Machinery Company, Utica, New York.

Check 3690 opposite last page.

Surfactants, their properties and characteristics, are covered in Emulphogene BC Bul — Antara Chemicals, Dyestuff & Chemical Division, General Aniline & Film Corp., 435 Hudson St., New York 14, N. Y.

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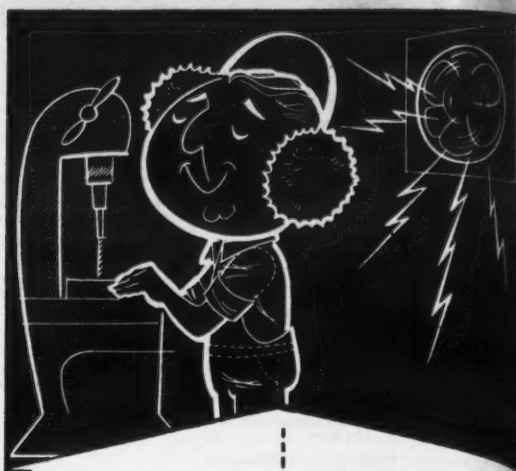
"It might help production—but it sure makes them harder to catch!"



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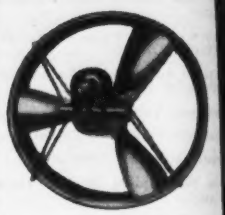

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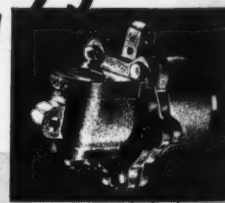

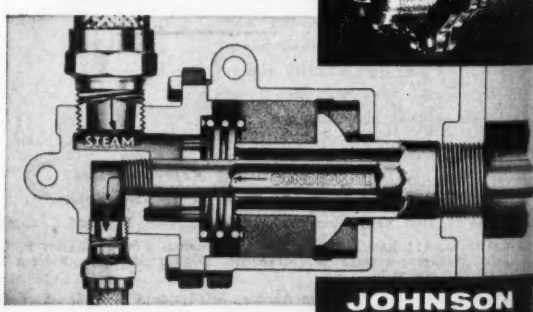

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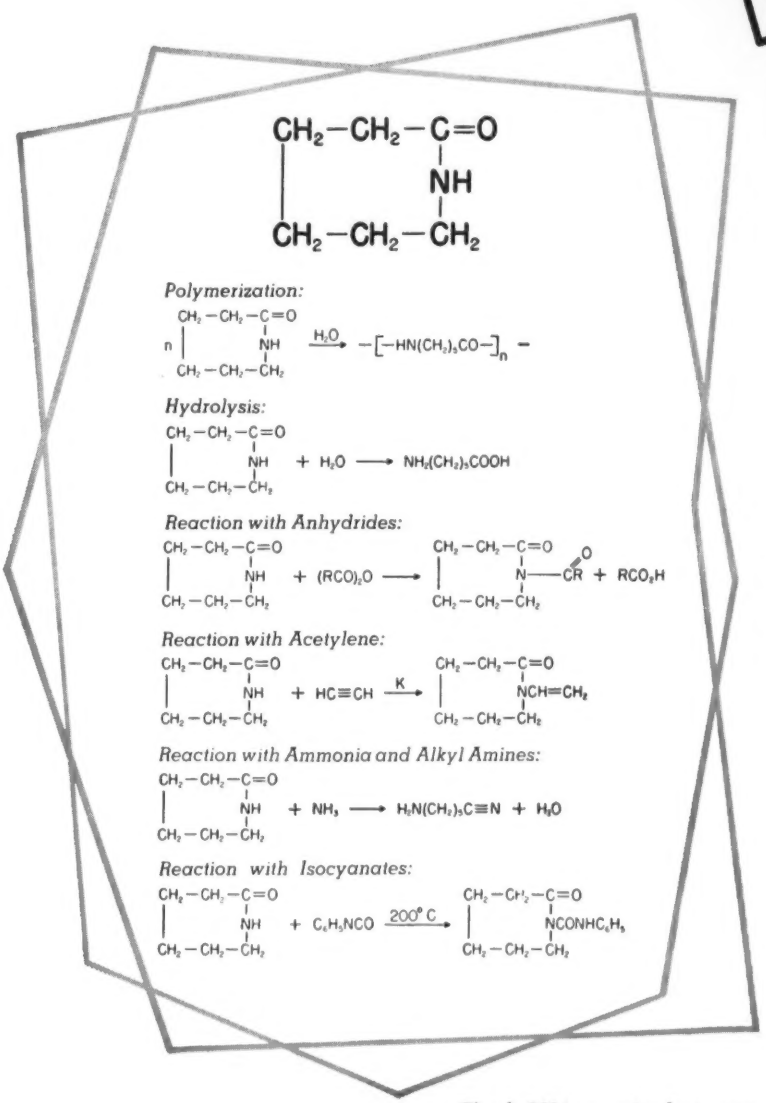

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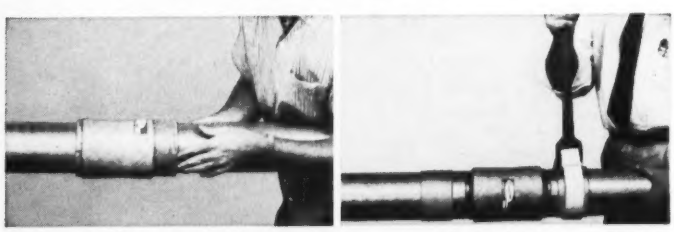

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